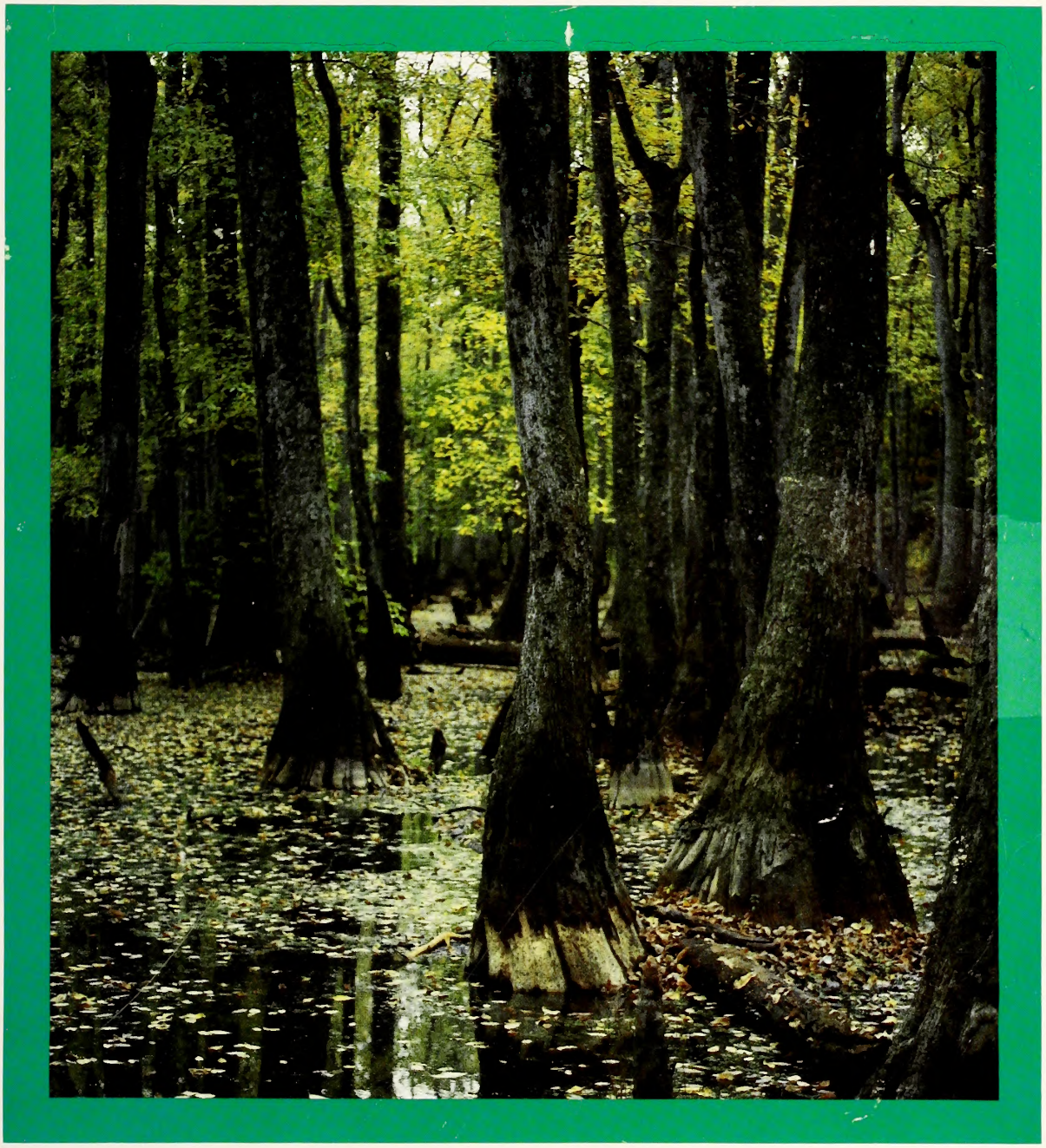
Planning Analysis and Environmental Assessment for the State of

LOUISIANA



U.S. Department of the Interior
Bureau of Land Management

Planning Analysis and Environmental Assessment

for the

STATE of LOUISIANA

SEPTEMBER, 1988

Prepared by

Department of the Interior
Bureau of Land Management

State Director, Eastern States Office

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Chapter I

Purpose and Need

A. Introduction

The Louisiana Planning Analysis (PA) is being prepared to provide management direction for public lands and Federal Mineral Ownership (FMO) under the Bureau of Land Management (BLM) jurisdiction in Louisiana. Section 202 of the Federal Land Policy and Management Act of 1976 (FLPMA) states "The Secretary shall, with public involvement and consistent with the terms and conditions of this Act, develop, maintain, and when appropriate, revise land use plans which provide by tracts or areas for the use of the public lands." The guidance for preparing this PA is contained in 43 CFR Part 1600, Public Lands and Resources; Planning, Programming, and Budgeting. Further guidance is given for planning in Eastern States through I.M. ES-87-53: State Director's Policy and Guidance on Planning in the Eastern States (August 10, 1987).

The National Environmental Policy Act of 1969 (NEPA) requires Federal agencies to prepare statements documenting environmental consequences of Federal actions, significantly affecting the human environment. An Environmental Assessment (EA) has been prepared for the Planning Analysis to determine if PA decisions will have significant impacts. If impacts are significant, NEPA....requires the preparation of an Environmental Impact Statement (EIS). The Council on Environmental Quality's Regulations for implementation of the procedural provisions of NEPA (40 CFR Part 1500) provide guidance for the preparation of Environmental Impact Statements. This document combines the PA and the EA into one package.

B. Planning Area Description

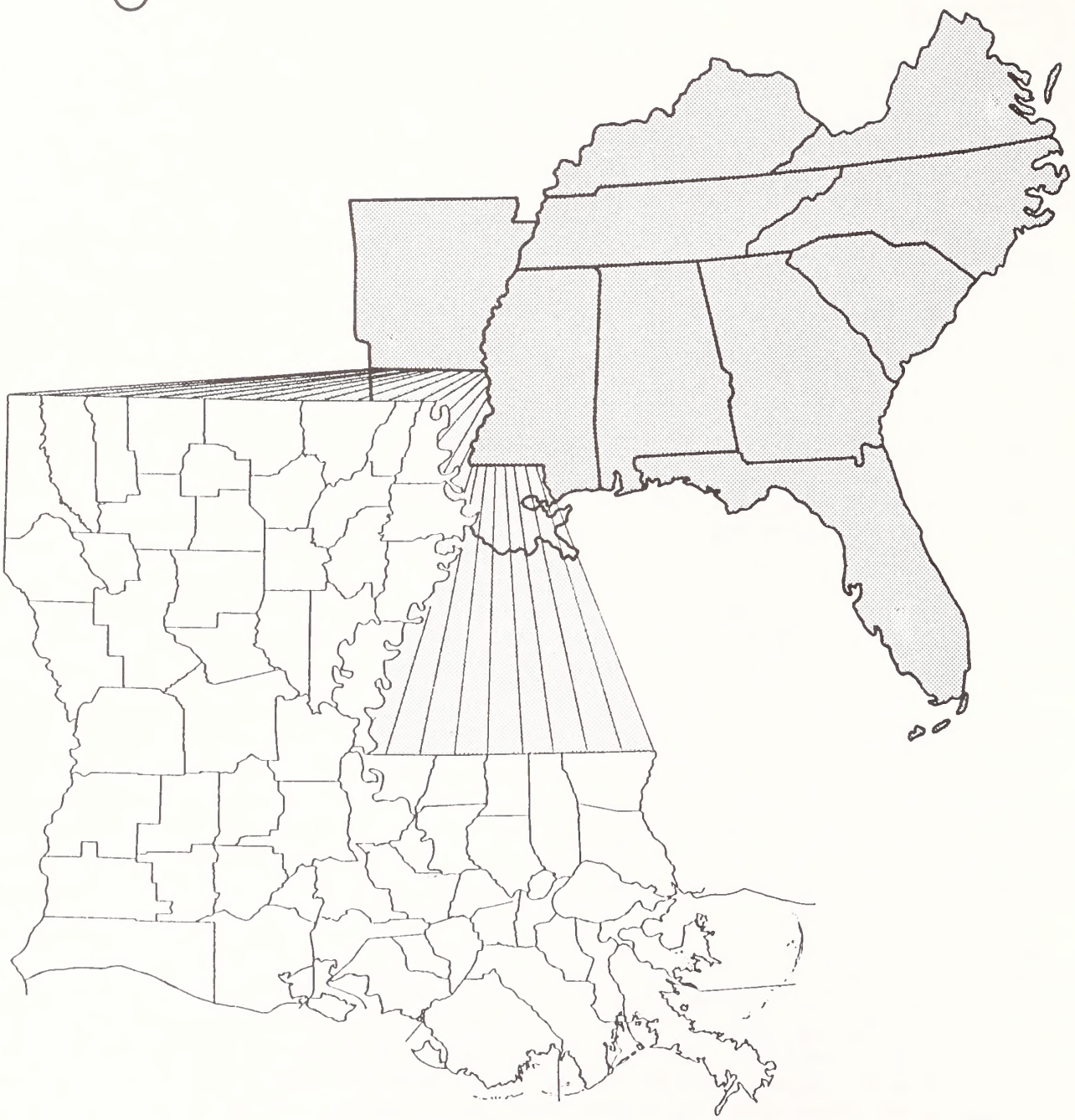
The planning area includes approximately 4,400 acres of public domain (PD) lands scattered throughout 28 parishes and a million acres of Federal mineral ownership (FMO) spread throughout the entire state of Louisiana. The planning area is located within the jurisdiction of BLM's Jackson District and is administered by the Eastern States Office, and the Jackson District Office.

The PD lands and associated FMO are totally managed by BLM. The remaining FMO administered by BLM underlies Federal, State, and private surface. Land use planning decisions affecting FMO underlying other Federal agency surface are the responsibility of those agencies. BLM planning relates to decisions on PD lands and related FMO, FMO under State and private surface, and FMO under other Federal agency surface where those agencies have given consent to lease based upon thier land use plans and NEPA documents. Chapter II contains further discussions on planning decisions and other agency policies/plans affecting mineral actions. This document represents a comprehensive approach to planning and decision-making for FMO on a statewide basis. In this planning effort BLM is coordinating mineral related land use decisions of the various surface managing agencies with the BLM decisions to commit the Federal Mineral resources through leasing or operations permitting.

U.S. DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

JACKSON DISTRICT OFFICE

Jackson, Mississippi



Jurisdicton: 11 Southeastern States

Figure 1

The insert map entitled Federal Mineral Interests in Louisiana depicts the Federal surface and mineral estate according to the best records presently available to the BLM. Sections A and B in Chapter III gives acreage figures and further explanation of the status of public land resources addressed in this Planning Analysis.

C. Planning Process

The BLM resource management planning process consists of nine basic steps and requires the use of an interdisciplinary team for the completion of each step. This process was followed in the preparation of this PA. The planning steps described in the regulations and used in preparing this plan are described below.

Step 1. Identification of Issues

This step is intended to identify resource management problems or conflicts that can be resolved through the planning process.

Step 2. Development of Planning Criteria

During this step, preliminary decisions are made regarding the kinds of information needed to clarify the issues, the kinds of alternatives to be developed, and the factors to be considered in evaluating alternatives and selecting a preferred alternative which after public review is the basis for the proposed plan.

Step 3. Inventory Data and Information Collection

This step involves the collection of resource, environmental, social, economic, or institutional data needed for completion of the process.

Step 4. Analysis of the Management Situation

This step calls for an assessment of the current situation. It includes a description of current BLM management guidance, a discussion of existing problems and opportunities for solving them, and a consolidation of existing data that is needed to analyze and resolve the identified issues.

Step 5. Formulation of Alternatives

During this step, several complete and reasonable resource management alternatives are prepared; including one for no action and several that strive to resolve the issues while placing emphasis either on environmental protection or resource production.

Step 6. Estimation of Effects of Alternatives

The physical, biological, economic, and social effects of implementing each alternative are estimated in order to allow for a comparative evaluation of impacts.

Step 7. Selection of the Preferred Alternative

Based on the information generated during Step 6, the District Manager identifies a preferred alternative. The draft PA/EA document is then prepared and distributed for public review.

Step 8. Selection of the Plan

Based on the results of public review and comment, the District Manager will select a proposed plan and publish it along with a final EA. A final decision is made after a 30-day protest period on the final EA.

Step 9. Monitoring and Evaluation

ERRATA

CHAPTER I, PAGE 4--STEP 8 OF THE PLANNING PROCESS INCLUDES AN APPEAL PERIOD BUT NOT A PROTEST PERIOD. A FINAL ENVIRONMENTAL ASSESSMENT WILL ONLY BE DONE IF THE PLAN DECISION DIFFERS FROM THE ALTERNATIVES CONTAINED IN THIS DOCUMENT AND WILL ONLY CONTAIN THE NEW DATA ON THE EXISTING ENVIRONMENT AND THE SUBSEQUENT ENVIRONMENTAL CONSEQUENCES.

environmental document will be developed. This action constitutes a plan amendment for the site-specific decision that conflicts with plan decisions.

C. Issues

Planning analyses deal with all resource programs in a planning area. However, only those aspects of current resource management which are felt to be issues are examined through the formulation and evaluation of alternatives. An issue may be defined as an opportunity, conflict, or problem regarding the use or management of public lands and resources.

The concept of an "issue" that is used in this document is that of a major resource value that can be significantly affected by Bureau programs. Thus, every issue will be examined in detail and alternatives methods of addressing the issue will be developed. There are other concerns, e.g., visual resources, wild or scenic rivers and paleontological resources, which will be considered but are not expected to be either a major resource or significantly impacted, or both. Also, as the plan develops there may be a need to add to or delete from this list of preliminary issues.

With the above definition of an issue, land disposal and mineral development are programs and will not be considered issues. Likewise, mineral withdrawal is one alternative method of protecting certain resource values but will not be a separate issue in itself. The issues are highlighted below with the planning questions the interdisciplinary team asked during the analysis of the management situation and in the environmental document.

1. Wildlife Habitat

Because of its location on the Gulf of Mexico and the presence of other physical features, the State of Louisiana contains abundant valuable wildlife habitat. This habitat contains not only common species but also threatened or endangered species and common species in significant concentrations, e.g., wintering waterfowl. Many of the species depend heavily upon the abundant water related resources found in the State. Any land disposal or leasing action must consider the impacts on the wildlife habitat.

Planning Questions:

What areas in the State are known to have significant/important wildlife values?

What areas in the State contain habitat for significant/important wildlife populations?

What stipulations are needed to protect wildlife habitat values?

Are any specific protective actions needed in any area?

2. Wetlands/Floodplains/Riparian/Coastal Zone

The presence of numerous meandering rivers and streams, including the Mississippi, together with the general low elevation of the State have combined to produce an abundance of wetlands, floodplains, and riparian zones. Closely associated with these areas is an extensive coastal wetland. These are fragile areas, easily modified by a variety of resource development activities, e.g., timber harvesting or mineral development. Also, the natural fluctuations that can occur impose limitations on any development that occurs. Leasing or land disposal activity must consider the impacts both to the resource and the potential for hazards to any development located in such areas.

Planning Questions

Where are the areas in which these resources are most prevalent and most sensative to surface disturbing activity?

What considerations must be made to prevent or mitigate damage to these resources as a result of plan decisions?

3. Water

A major resource in Louisiana is the abundance of water. A majority of the land area in several parishes is inundated by bodies of water and wetlands. As might be expected, the groundwater resources are, in general, shallow. Because water resources are so abundant, there is the potential for contamination from a variety of sources. Surface activities can create discharges which enter the water system. Mineral extraction can introduce natural or manmade substances to both surface and groundwater. Hazardous materials can receive wide distribution if carried by either surface or groundwater.

Planning Questions:

In which areas is there a high danger of discharge of contaminants to surface or ground water?

What special considerations must be made to surface disturbing activities in high potential areas to limit/prevent discharge into surface waters?

What special considerations need to be made to mineral development activities to limit/prevent discharge to groundwater?

4. Geologic Hazards

In any area where oil and gas development is likely, geologic hazards and their effects on public safety and air quality must be considered in a plan. One of the more obvious results of oil and gas development is the secondary impact due to processing of the product at refineries or other facilities. Also, the possibility of accidental release of "sour" gas (gas containing toxic hydrogen sulfide) must be considered in oil and gas leasing and development. There are also geologic zones with high pressure which present safety hazard in drilling and operations.

Planning Questions

Is there a possibility of high geologic pressure and/or "sour" gas occurring? Where?

What safeguards are necessary to protect the environment from "sour" gas?

5. Soils

There are a variety of soil conditions in the State which are generally stable if undisturbed. However, disturbance of the surface for mineral development or other purposes can contribute to soil movement. Any land disposal or mineral action must consider the impacts upon the soil resource.

Planning Questions:

Where are the stable/unstable soil conditions in the State?

What considerations should be made in mineral leasing and development to protect the soils?

6. Areas of Critical Environmental Concern

One of the provisions of FLPMA was the ability to designate areas of critical environmental concern (ACEC's) during the planning process. There are certain established criteria for what constitutes an ACEC but there are no size restrictions or requirements/limits on the number of ACEC's designated. All disposal actions and mineral development will need to consider the special management that would be found in ACEC.

Planning Questions:

Are there any lands managed by the Bureau that qualify for consideration for ACEC designation?

D. Planning Criteria

Planning criteria were developed for each issue to aid in the formulation of the PA plan alternatives and the EA process. More specifically, planning criteria (1) aided in the compilation and analysis of inventory data; (2) helped determine the level of detail and scope of the analysis of the recommendations; (3) identified specific laws, policies, and regulations limiting the types of recommendations appropriate of the plan; and (4) provided a logical thought process for developing the plan alternatives. Planning criteria are based on:

1. National, regional, and local law and regulations;

2. Multiple-use and sustained yield principles set forth in the Federal Land Policy and Management Act;

3. BLM national and State Director guidance;

4. Results of public participation and coordination with other Federal, State, and local agencies;

5. Analysis of data and information needs;

6. A systematic interdisciplinary approach to achieve integrated considerations of physical, biological, economic, social, and environmental conditions.

7. The planning process will identify those lands which will best serve public needs by being retained in Federal ownership, and those lands which are difficult or uneconomical to manage or would best serve important public objectives by their disposal. All public land tracts in the planning area have been placed in a disposal category by a policy decision of the BLM Eastern State's Director.

   Types of realty actions will be prioritized according to how well they serve the public interest or resolve problems.

   Decisions will not be made in the PA about specific realty cases.

8. Exploration and development of minerals will continue to be a priority, subject to those measures necessary to adequately protect other values and uses.

E. Interrelationships With Other Agencies, Groups, and Individuals

Public land and Federal Mineral Ownership in Louisiana is interspersed with other Federal, State, and private land. This land ownership pattern makes close coordination necessary to accomplish goals and avoid resource use conflicts. The interrelationships between BLM's resource management programs and other groups and government agencies are discussed in Chapter II.

As stated earlier under Planning Area Description, this document represents a comprhensive statewide planning approach for all Federal minerals in the State of Louisiana. The success of the planning and decision making hinges upon effective information exchange among BLM, the State government, other Federal agencies, private surface owners over FMO, and the public. BLM is presently implementing a records automation project and an automated lands and minerals records system (ALMRS) that will help facilitate the needed interagency coordination. As the system is implemented in ESO and JDO, it will be made available to other surface and mineral managers. Through improved information resource management, the BLM has as its goal more effective land and mineral resource management.

Chapter II

Alternatives

A. Alternative Formulation Overview

The planning process outlined in Chapter I was followed in this effort, however, resource management planning in the Eastern United States is considerably different than in the West. While the range of potential issues is limitless (with the number of political jurisdictions, interest groups, ecosystems, geologic structures, etc.), the range of alternatives is limited. With respect to public domain (PD) land, the BLM policy is to dispose of the scattered, unmanagable tracts and clear title problems where they occur. Therefore, the range of alternatives for PD tracts focuses on method of disposal (i.e., Recreation and Public Purpose (R&PP) transfer, sale, withdrawal or exchange). The plan, however, cannot get too detailed on disposal method and transfer-recipient, because most disposals are applicant-driven. If the preferred alternative is too specific, it could preclude processing of an unexpected but viable application.

With regard to mineral leasing alternatives, in many cases, the decision to lease or not lease has already been made by law, policy or precedent. Areas closed to leasing by law or policy have been identified. The plan also attempts to identify areas with mineral development potential that are as yet unleased (i.e., sodium, salt and lignite).

With regard to mineral development, the plan focuses on special management areas, defined by unique or critical resources or issues, which should be considered when development decisions are being made. For instance, the State Historic Preservation Officer's (SHPO's) staff identified areas where they may request surveys or no surface occupancy (NSO) stipulation. Threatened or endangered species habitat, coastal wetlands, geologic hazards, and other potentially critical areas have also been discussed or delineated. These all helped define the range of alternatives. Of course, because many areas are already leased and developed, certain plan-related stipulations cannot be applied until re-leasing or reassignment. In unleased or undeveloped areas, they will be a part of the decision-making process.

The U.S. Forest Service has already adopted a preferred alternative for its lands and minerals, and has completed an Environmental Impact Statement. This plan highlights those decisions in order to comprehensively address FMO.

B. Alternatives Eliminated From Detailed Study

1. Maximum Unconstrained Alternative for Production or Protection

A maximum unconstrained alternative was not considered because no alternatives were considered that proposed maximum production or protection of one resource at the expense of other resources. Alternatives considered in detail must be feasible and implementable, and these types of alternatives would violate the BLM's legal mandate to manage public land resources on a multiple use, sustained yield basis.

2. Reduction of Restrictions in Oil and Gas Areas

An alternative was considered that would have minimized or eliminated restrictions in areas classified as having high potential for the occurrence of oil and gas. The intent of such an alternative would have been to allow maximum access to these areas. Most areas with high oil and gas potential already are subject to fewer constraints than other areas; thus, such an alternative did not seem to be necessary.

3. Retention of Public Domain Tracts

An alternative was considered that would have required BLM retention and management of remaining public domain tracts in Louisiana. This would not be cost-effective and it is inconsistent with the policy stated above under Alternative Formulation Overview.

C. Management Common to All Alternatives

This section of the plan includes a discussion of BLM's basic management responsibilities and procedures for which alternatives are not developed. Although it has been previously stated that this Planning Analysis does not contain decisions for certain minerals, such as lignite, this section does contain management responsibilities related to these minerals. (For instance, the paleontological and cultural resources sections contain discussions of BLM responsibilities in coal management.) Also included is a section on other agency policies/plans affecting minerals actions. This is included because other agency consent is required if the FMO is to be leased by BLM. Therefore, for much of the FMO in Louisiana, other agency decisions are integral to BLM management.

1. Lands

a. Disposal of Surface

The public lands under Jackson District jurisdiction in Louisiana tend to be small, isolated parcels. With staff only in Jackson, Mississippi, BLM cannot manage these scattered lands as actively, efficiently, or cost-effectively as others might. As stated previously, it has been BLM policy in Eastern States to inventory and dispose of appropriate parcels identified in the planning process through sale or transfer to other Federal agencies, state governments, or local governments or organizations. The aim is to identify, through an open and orderly planning process, the best use and most suitable manager for each piece of land.

The fact that, traditionally, BLM has had no active management presence among these surface tracts has led to complications as the agency pursues its policy of inventory and disposal. Over the years, title conflicts have developed or instances of unauthorized occupancy taken place, coming to light only as BLM moves to verify Federal ownership and dispose of the land. In many cases, before BLM can actually take action to dispose of a parcel, it must perform a survey or resurvey of the land (which may have changed in character since the original

survey); deal with potential title conflicts, encumbrances and Color-Of-Title claims; and verify that the land is not swamp in character (and therefore ineligible for sale, but eligible for swamp selection by the state). It is fully as complex a matter to dispose of a 40-acre parcel as it is to dispose of one 100 times the size.

Recreation and Public Purposes Act Conveyances

Under the Recreation and Public Purposes (R&PP) Act of 1926, as amended, state and local governments and non-profit organizations may apply for title to public lands which they propose to put to worthwhile public use. If the application and accompanying plan is approved by BLM, title is conveyed at little or no charge, with the stipulation that the land must be used for the intended purpose or ownership will revert to the United States.

BLM's responsibilities regarding R&PP conveyances do not end with the issuance of a patent. At five year intervals, BLM staff visit the site to ensure the recipient's compliance with the original management plan.

Land Sales

BLM is authorized to dispose of unmanageable public lands under Section 203 of the Federal Land Policy and Management Act. Sales in the Eastern States generally follow a statewide planning effort to systematically deal with all BLM-administered lands and resources in the area. Each sale must be preceded by a site-specific land report/environmental assessment, which investigates such possibilities as the presence of archeological sites or threatened or endangered species or their habitat. When a sale is held, the minimum acceptable price is the assessed fair market value of the land, as determined by BLM realty specialists in the Jackson District Office (JDO).

Most BLM land sales in the Eastern States are competitive sales, announced through a "notice of realty action" in the Federal Register, then publicized through the press. Sealed bids are accepted until a specified time, and then opened in the public, either at ESO headquarters or at the JDO. In some instances (e.g., "modified competitive sales"), the adjacent land owner is offered the opportunity to match the highest bid received.

Color-of-Title Claims

Occasionally an individual, group, or corporation claims ownership of a parcel that BLM considers public land. Under the Color-of-Title Act, claimants may file a peaceful, adverse possession claim through a Color-of-Title application.

Under Class I Color-of-Title applications, claimants become eligible for title if they can prove they have held the land in good faith for at least twenty years, and have cultivated or built improvements upon some portion. Class II claimants must show an unbroken chain of title extending back to January 1, 1901.

Withdrawal Review

BLM was mandated by the Federal Land Policy and Management Act to review withdrawals of western public lands in order to ensure that the original purpose of those withdrawals was being fulfilled. ESO has a similar program underway for the East. Tract books for the 5 public land states under JDO jurisdiction are being reviewed to identify all withdrawals. Surface managing agencies are contacted to certify that their records match those of ESO, and then are requested to review the withdrawn areas to see if all are being put to their intended use, and if any might be relinquished. Conversely, if lands are identified in the planning process as being potentially useful to another Federal agency, that agency may ask that those lands be withdrawn from public land laws and/or mining laws to allow for their use.

Special Legislation

Occasionally, situations arise where title conflicts cannot be resolved with BLM's existing authorities. In these situations, Special Legislation that grants new authority to resolve a particular problem or conflict is needed. In recent years, ESO has been successful in getting the following special legislation passed; Seneca County, Ohio, the Coosa and Chattooga Railroad lands in Alabama and the Wisconsin Hiatus. Efforts are currently underway to get new legislation on a state-by-state basis to resolve these conflicts by allowing more administrative flexiblity.

b. Trespass Abatement

Existing unauthorized uses of public land will be resolved either through termination, authorization by lease or permit, or sale. Decisions will be based on consideration of the following criteria:

-- The type and significance of improvements involved;

-- Conflicts with other resource values and uses, including potential values and uses; and

-- Whether the unauthorized use is intentional or unintentional.

New cases of unauthorized use generally will be terminated immediately. Temporary permits may be issued to provide short-term authorization, unless the situation warrants immediate cessation of the use and restoration of the land. Highest priority will be given

to abatement of the following unauthorized uses:

-- new unauthorized activities or uses where prompt action can minimize damage to public resources and associated costs;

-- cases where delay may be detrimental to authorized users;

-- cases involving special areas, sensitive ecosystems, and resources of national significance; and

-- cases involving malicious or criminal activities.

c. Rights-of-Way

Right-of-Way (ROW) applications will continue to be approved on a case-by-case basis. Most of the present ROW applications are for maintenance or upgrading of an existing ROW. Applicants are encouraged to locate new facilities within existing ROW. The District Office is involved in a review of all existing ROW in the State.

d. Leases, Permits, and Easements

Legitimate uses of public land may be authorized on a case-by-case basis by permits, leases, and easements if they cannot be authorized by other laws and regulations.

Permits may be granted for a maximum of three years for uses that require no extensive improvements, construction, or surface disturbance.

Leases may be granted to authorize use of public lands for long-term developments such as cultivation, small trade, or manufacturing concerns.

Easements may be authorized to assure that the uses of public land, by the public, can be maintained and guaranteed if the land passes to private ownership. Easements may be used to preserve cultural and historic resources and threatened or endangered animal species on public and adjacent private land if it is determined to be in the public interest.

It has been the policy in the District to discourage temporary use authorizations in favor of transfers or disposal of public domain tracts.

2. Minerals

Private industry is encouraged to explore and develop Federal minerals to satisfy national and local need. This policy provides for economically and environmentally sound exploration, extraction and reclamation practices. Public lands are open and available for mineral exploration and development unless withdrawn or administratively restricted. Mineral development may occur along with other resources uses. Programs to obtain and evaluate current energy and mineral data are encouraged.

a. Saleable Minerals

The District will meet the demand for these resources through sales or free use permits on a case-by-case basis, as in the past.

b. Locatable Minerals

Mineral exploration and development in the District will continue to be administered through existing surface and mineral management regulations (43 CFR 3809 and 43 CFR 3800).

c. Leasable Minerals

In 1981, a Regional Environmental Assessment (EA) of the BLM oil and gas leasing program in the southern states was prepared. In the same year, the U.S. Geological Survey (USGS) did an EA for oil and gas drilling operations on Federal Mineral Ownership. Together, these documents have served as the policy for oil and gas activity in Louisiana. Alternatives, including the proposed action and no leasing, were considered in the EA's. Exploration and development on public lands will continue to be managed in accordance with these documents until adoption of this Planning Analysis. Additional environmental analysis responsibilities originally assigned to the USGS were transferred to the BLM during 1983 assuring that oil and gas operations are conducted in a manner which protects other natural resources and the environmental quality. These responsibilities pertain to seismic exploration on PD surface and well drilling on any surface containing a Federal oil and gas lease.

BLM responsibilities pertaining to Fluid Minerals are detailed in Appendix 1--Standard operating procedure for Fluid Minerals.

d. Other Agency Policies/Plans Affecting Mineral Actions

The BLM policies and legal framework for mineral leasing were discussed in the introduction. Minerals management responsibilities for BLM are outlined in 43 Code of Federal Regulation (CFR), Group 3000. Most of the FMO was acquired and, therefore, is under the mandates of the Mineral Leasing Act (MLA) for Acquired Lands of 1947. FMO that was not acquired but is underlying a surface managing agency is under the mandates of the MLA of 1920. These laws were ammended by the Oil and Gas Reform Act of 1987, which is summarized in Appendix 1. The laws and regulations establish separate functions for BLM and the surface managing agencies (SMA). SMA's are defined in the regulations as "any Federal agency outside of the Department of Interior with jurisdiction over the surface overlying Federally-owned minerals". Basically, BLM must have SMA's consent to lease. The regulations also set certain areas aside where leasing is restricted or cannot be undertaken. These areas include National Parks and Monuments; incorporated cities, towns and villages; National Recreation Areas; National Wildlife Refuges and Fish Hatcheries; National Wilderness; National Trails; certain tidelands and submerged coastal lands; naval petroleum and oil shale reserves; Indian trusts; and others.

The BLM can also have mineral ownership retained and kept under its jurisdiction when the General Services Administration transfers or sells excess acquired surface lands. This is particularly true where the minerals are potentially valuable.

The major Federal surface managing agency in the State of Louisiana is the U.S. Forest Service. The Kisatchie National Forest is located within seven parishes of west-central and northern Louisiana. These parishes are Rapides, Grant, Vernon, Natchitoches, Winn, Claiborne and Webster.

The Forest Service has completed a Land and Resource Management Plan and Environmental Impact Statement (EIS) for the Kisatchie National Forest that identifies their policies toward mineral leasing. The plan states that mineral leasing is permitted throughout the forest except in special designated areas. The plan also identifies that leasing will be subject to standard stipulations necessary to protect surface resources on and off site. Leasing decisions on the forest will be consistent with the management prescriptions outlined in the Forest Plan.

By the terms of the 1964 Wilderness Act, Federally-owned minerals within the Kisatchie Hills Wilderness Area were withdrawn from mineral entry as of January 1, 1984. In addition to the 8,700-acre Kisatchie Hills Wilderness Area, the Plan addresses another 23 management areas. One management area is non-forest and therefore has no prescription. One tract with almost 37,000 acres has intensive use by the military and requires consultation before any action can take place. Seventeen areas totaling almost 67,000 acres have No Surface Occupancy or other Special Stipulations. Four areas totaling over 477,000 acres use Forest-wide management prescriptions.

The second largest Federal surface management agency is the U.S. Fish and Wildlife Service. By regulation (43 CFR 3101.5), "... no offers for oil and gas leases covering wildlife refuge lands shall be accepted and no leases covering such lands shall be issued except ..." for Federal lands being drained of oil and gas from adjacent lands. Another exception is where operations existed before aquisition. The withdrawal of refuge lands from mineral leasing is also covered in 43 CFR 3201.1-6 and 3400.2. The majority of land managed by USFWS was acquired. One hundred percent of the land in the Breton and Shell Keys Refuges were reserved from the public domain, as were between six and seven percent of the Delta Refuge. All of the remaining seven Refuges were acquired.

The Department of Defense (including the Corps of Engineers) is the third largest Federal surface management agency in Louisiana. The U.S. Army has the largest acreage with Fort Polk (198,325 acres) and the Louisiana Army Ammunitions Plant (14,974 acres). The Navy has the New Orleans Naval Air Station (5,233 acres) and Naval Support Activities (4,418 acres). The Air Force has the largest number of facilities with England (3,582 acres) and Barksdale (7,994 acres) Air Force Bases, the Hammond Air National Guard Command Station (147 acres) and four other small stations or radar sites. Federal mineral leasing is done on these lands on a case-by-case basis with the consent and stipulations established by the facility commander.

Lands acquired by the Corps of Engineers for its own use are leased on a case-by-case, project-by-project basis. The Corps will grant or deny consent to lease, and, if consent is given, can require stipulations to protect the use for which the land was acquired. The Corps can also acquire land for other agency management, in which case the other agency maintains the right to give or deny consent.

The next surface management agency in terms of acreage managed is the National Park Service, with the Jean Lafitte National Park and Chalmette National Historic Park. The park lands, like refuge and Wilderness lands, are withdrawn from mineral leasing and development.

The remaining surface management agencies, including the BLM which manages public domain lands, have relatively small, scattered tracts of land. Leasing decisions for these lands have usually been made on a case-by-case basis according to the policies and plans of the individual agencies. Also in this category is the BLM-managed FMO under private or State surface. This plan is designed to improve the decision-making process for the FMO in the State by providing a comprehensive framework for leasing decisions. This will make the industry and the public aware of what issues and resources guide the decision making, and, thus, what decisions to anticipate in the various areas of the State.

3. Paleontological Resources

The Federal Land Policy and Management Act, Sections 102(a)8, 201(a) and 202(c), requires that the BLM identify and evaluate paleontological resources on public lands to insure that these resource are adequately addressed in the BLM's planning system and environmental analysis documents. Paleontological resources of significant scientific interest identified through the BLM planning process will have management plans developed to protect them. Protection will ordinarily be accomplished through salvage or on-site mitigation rather than through restrictions imposed on the use of the public lands.

BLM's policy is that minerals such as coal, oil shale, bitumen, lignite, asphaltum and tar sands, as well as some industrial minerals such as phosphate, limestone, diatomaceous earth and coquina, while of biologic origin, are not to be considered as paleontological resources. Fossils of significant scientific interest that may occasionally occur on public domain will be evaluated for protection within the context of a given project.

The Department of the Interior's Solicitor has limited BLM's responsibility with respect to paleontological sites located beneath lands that are not publically owned (i.e., situations of split estate with Federal minerals and private surface). Nonetheless, BLM has determined that it will ensure the protection of such significant sites below private surface through

incorporation in the mineral lease of stipulation similar to the following:

> (1) A paleontologist will make a careful search of mine faces wherever they are reasonably accessible, preferably after they have been stabilized but before they are covered or reclaimed. (2) Spoil dumps in the mining area will be searched also, and whenever intact specimens are recovered, a special effort will be made to search the source area from which they were derived. (3) Where significant concentrations or unusually interesting fossils are recovered, more intensive searching will be concentrated in the source area. A stratigraphic section will be measured and the lithologies noted or sampled. (4) Fossil specimens and field notes will be presented to a permanent museum such as the Smithsonian or the State Museum, where they will be curated and made available to appropriate researchers.

4. Threatened and/or Endangered Species

Threatened and Endangered (T/E) Species clearance procedures are required for all BLM actions in Louisiana which could jeopardize such species or related habitats. Such actions include future coal lease applications, land cases and other minerals leasing. Consultation requirements as mandated by the Endangered Species Act of 1973, as amended, (Public Law 93-205 and CFR Part 402), apply to actions by all Federal surface management agencies. In these cases, informal (or formal as necessary) consultation will be completed with appropriate USFWS field offices.

Issues to be addressed by the FWS include: (1) lists of endangered and threatened species and related supportive information, (2) habitat evaluation for fish and wildlife values, and (3) coordination and assistance under the National Environmental Policy Act of 1976 (PL 91-190), Fish and Wildlife Coordination Act (16 U.S.C. 661-667e), and other applicable regulations.

Additionally, BLM directs District office consultation with States, including Louisiana, which have T/E laws.

Maintenance and Operation Elements for habitat & endangered species management involve the following:

-- Inventory and identify T/E concerns, perform informal and formal Section 7 consultation, and protect critical habitats.

-- Identify and mitigate impacts of Bureau actions on critical habitat on split-estate lands (e.g. land cases, oil & gas leasing, coal Lease by Applications, nonenergy leasables.

-- Participation in special recreation resource designations.

-- Monitor wildlife habitat values impacted by existing land and mineral leases and by other activities, including hazardous waste.

5. Cultural Resources

Before licensing or approving any undertaking that may affect properties listed or eligible for listing in the National Register of Historic Places, Section 106 of the National Historic Preservation Act (NHPA) requires that Federal agencies do two things:

(1) Agencies must take into account the effect of their undertakings on historic properties.

(2) Agencies must allow the Advisory Council on Historic Preservation (hereinafter "Council") a reasonable opportunity to comment on the agencies' undertakings.

Supplementing the Council's regulations are court decisions which have helped define the nature of compliance with Section 106 and related authorities (i.e., Executive Order 11593, 36 CFR Part 800, and the National Environmental Policy Act (NEPA)). The courts have ruled on many points relevant to BLM, some of which are summarized below:

(1) Federal agencies are required to comply with NHPA regardless of the public or private character of the property involved.

(2) Agencies have affirmative responsibilities to locate and identify any eligible properties within the area of an undertaking's impact. This extends to all properties that possess the qualifying characteristics, not just those already officially recognized as eligible.

(3) The provision in 36 CFR 800.4(a)(2), that the agency follow the State Historic Preservation Officer's (SHPO) recommendation that a survey be done, is interpreted to require the agency to follow the SHPO's recommendation unless it can show good cause for not doing so. The Council's regulations do not require agencies to survey 100 percent of the impact area. The scope of the survey varies from case-to-case. A complete survey is not necessary where partial survey and other evidence indicate that a complete survey would be fruitless.

(4) Both NHPA and NEPA create obligations that are chiefly procedural; both have the goal of generating information about the impact of Federal actions on the environment, including cultural resources; and both require that the Federal agency carefully consider the information produced and take historic values into account in its decision making. The Council's regulations likewise impose a procedural rather than a substantive obligation.

These court findings establish the broad parameters for complying with Federal preservation law. The courts have also ruled on some of the legal requirements under specific programs, such as mineral leasing, vis-a-vis Section 106 compliance. The statutory and regulatory requirements, specifically for oil and gas and coal leasing, are discussed separately below since these particular programs are ESO's primary area of responsibility and since they establish slightly different procedures for Section 106 compliance.

In addition, under Section 110(a)(1) Federal agencies are required to "assume responsibility for the preservation of historic properties which are owned or controlled by such agency." In assuming such responsibility, ESO will:

1. Undertake a program to identify historic properties under its jurisdiction or control.

2. Identify opportunities for the effective use and preservation of historic properties.

3. Identify potential conflicts between preservation of historic properties and implementation of agency mission requirements.

4. Identify areas where information is insufficient to make decisions about historic properties.

5. Consider the effects of proposed activities on historic properties early in planning activities.

6. Seek opportunities for cooperative efforts with other Federal agencies, State and local agencies, and the private sector in the preservation and use of historic properties.

The Surface Mining Control and Reclamation Act (SMCRA) regulates surface coal mining operations and reclamation. Various sections of SMCRA require consideration of historic properties, most importantly sections 522(a) and 522(e) of the Act (See Appendix 2). The Office of Surface Mining (OSM), with whom enforcement responsibility rests, has promulgated regulations under the Act (43 CFR 3400). Regulations at 43 CFR 3461 implement the general unsuitability criteria and the prohibitions against certain lands.

Coal unsuitability criterion number 7 states:

> "All publicly owned places on Federal lands which are included in the National Register of Historic Places shall be considered unsuitable. This shall include any areas that the surface management agency determines, after consultation with the Advisory Council on Historic Preservation and the State Historic Preservation Officer, are necessary to protect the inherent values of the property that made it eligible for listing in the National Register."

The courts have ruled that the provisions of Section 522 of SMCRA, during the coal unsuitability screening process, protect only historic properties actually listed in the National Register. The court suspended OSM's regulations which extended protection to properties eligible for listing. The courts also found that Congress intended to protect both privately owned and publicly owned places on the National Register. Current Federal policy is to apply the coal unsuitability criterion to the listed National Register sites, in full compliance with Section 522(e)(3) of SMCRA, and then to comply with other provisions of both SMCRA and the NHPA during the application of the multiple resource trade-off screen. The unsuitability criterion is only a portion of the land use planning requirements for cultural resources and does not in any way relieve the Federal surface management agency of its responsibilities under Section 106 to consider the effect of undertakings, such as coal leasing, on places listed, or eligible for listing in the National Register and to provide the Council a reasonable opportunity to comment.

Guidelines and procedures for processing Applications for Permit to Drill (APDs) for oil and gas operations are found in Onshore Oil and Gas Order No. 1 (OOGO No. 1), Approval of Operations on Onshore Federal and Indian Oil and Gas Leases (See Appendix 1). As with all other Federal undertakings, BLM's responsibility pursuant to 36 CFR 800.4(a) is to "...identify or cause to be identified any National Register eligible property that is located within the area of the undertaking's potential environmental impact and that may be affected by the undertaking." As previously noted, this responsibility applies to any and all areas of Federal undertakings, regardless of surface status. Under OOGO No. 1, a survey is required for approval of an APD if there is reason to believe that an eligible property exists in the area of potential effect. In situations of split estate with Federal minerals and private surface, access to conduct cultural resource work may be denied by the surface landowner. Even if permission is denied this does not negate the Bureau's responsibilities under Section 106 to consider the effect of a proposed undertaking upon eligible properties. Neither does this negate the requirement under OOGO No. 1 for the lessee/operator to use his best efforts to avoid such impacts.

6. Visual Resources

Visual resources will continue to be evaluated as part of activity and project planning. Evaluation considers the significance of a proposed project and the visual sensitivity of the affected area. Stipulations are to be attached as appropriate to assure compatibility of projects with management objectives for visual resources.

7. Wilderness

Section 603(a) of the Federal Land Policy and Management Act (FLPMA) established a 15-year period from 1976 to 1991 for review of roadless areas of 5000 acres or more and roadless islands of the public lands, identified during the inventory required under Section 201(a) of FLPMA as having Wilderness characteristics described in the Wilderness Act of September 3, 1964. Section 603(c) of FLPMA mandates that during the period of review, the lands shall be

managed in a manner that will not impair the suitability of such areas for preservation as Wilderness. All of ESO's lands, including those in Louisiana, have been inventoried for Wilderness potential and have been found to lack Wilderness characteristics.

8. Areas of Critical Environmental Concern (ACEC)

There are no ACECs identified in the State. If such areas are identified in the future and their resource values cannot be protected through other management techniques, ACEC designation may be made.

9. Hazardous Wastes

Section 3016 of the Resource Conservation and Recovery Act (RCRA), as amended in 1984, requires all Federal agencies to inventory all hazardous wastes sites on or adjacent to land under their jurisdiction. The inventory is to be submitted to the Environmental Protection Agency every two (2) years. BLM will continue to maintain this inventory for all public domain tracts in Louisiana.

D. Alternatives

The following section gives a brief statement of the management actions for each of the three alternatives considered for BLM resources in the State of Louisiana. The management emphasis and actions will direct future BLM decisions involving oil and gas leasing, oil and gas operations and land tenure management. The differences among alternatives focus on the issues and on critical elements of the human environment as they relate to, or are impacted by, BLM decisions. Table 16 in Chapter IV gives a comparison of the impacts of management alternatives by decision type and resource.

1. Alternative A (No Action - Continuation of Current Management Alternative)

a. Management Emphasis

The no action alternative represents the continuation of current management. Any new proposals would have to be consistent with current levels. Generally, project proposals (i.e. mineral lease actions, mineral development or lands transfer) would be considered through an environmental assessment on a case-by-case basis. Uses or actions are not developed or permitted according to any plan, allowing little consideration of cumulative impacts or other potential uses of the same land. Oil and gas leasing would continue under the Regional Oil and Gas EA for the southeast. The Bureau would continue to process applications for permit to drill. Public Domain lands would remain under BLM jurisdiction; however, the agency would continue to respond to color of title or Recreation and Public Purposes Act (R&PP) applications, or nominations for sale of public land. Management would be characterized as reactive. This is a limited protection alternative since very little is considered beyond legislative or regulatory requirements.

b. Summary of Management Actions

Issues Related Management

1. Wildlife Habitat

Oil and Gas Leasing--BLM follows the procedure for threatened or endangered species (T&E) outlined in the management common section of this Chapter. Standard lease stipulations would be applied except where additional stipulations are developed as a result of informal consultation with USFWS and Louisiana Natural Heritage Program during prelease stage. These special stipulations can be anticipated in the areas shown on Figure 9--T&E Wildlife Species in Louisiana. Examples of stipulations are given in Chapter IV, Alternative A.3. Wildlife and Threatened and Endangered Species.

Oil and Gas Operations--BLM consults with USFWS and Louisiana Natural Heritage Program during EA preparation for Application for Permit to Drill (APD) and Notice of Staking (NSO) processes. Mitigation measures (such as site inventory requirements, protective zones, no surface occupancy (NSO) requirements, or seasonal restrictions) are required as they are determined necessary through consultation.

Land Tenure Management--BLM consults with USFWS and Louisiana Natural Heritage Program during application processing on a case-by-case basis. Mitigation measures (such as conservation easements, use restrictions, management plan amendments, etc.) and decisions to approve or deny applications result from consultation on cases where BLM has the discretion to approve or deny (i.e., Class 2 Color-of-Title, FLPMA Sale, Right-of-Way, Withdrawal, and Recreation and Public Purpose Act transfers).

2. Wetlands/Floodplains/Riparian/Coastal Zone

Oil and Gas Leasing--Not Addressed

Oil and Gas Operation--Impacts to these sensative resources will be managed on a case-by-case basis during the environmental review process discussed under operations in the Standard Operation Procedures Appendix (Appendix 1). If the tract appears to be a wetland, then the operator will be told they need to inquire about the necessity of obtaining a "404" permit from the Corps of Engineers. If the tract is in coastal wetlands, the operator will be required to have a Coastal Use Permit from the State. Modifications and developments in these wetlands and in the 100-year floodplain will be mitigated as outlined in Chapter 4.

Land Tenure Management--The preferred disposal method for PD tracts with these sensative resources is transfer (by withdrawal or Recreation and Public Purposes Act) to conservation agencies better able to manage them. Discretionary actions (Color-of-Title, Class II, FLPMA Sales, ROW's, and Land Use Permits) are only be taken if conservation easements are attached to the patents or permits. In Class I, Color-of-Title cases (non-discretionary), the patent recipient will be informed of the sensitive resources on the tract and of protective management practices they could employ.

3. Water Resources

Oil and Gas Leasing--BLM relies on the standard water quality permitting procedures outlined in the committed mitigation discussion of Chapter 4 (Alternative A, Water Resources) and standard lease terms (Section 6) detailed in Appendix 1.

Oil and Gas Operations--Same management as described above under leasing. Additionally, a well casing program and other mitigation measures are used to protect freshwater zones, and reserve pits and other mitigation measures are used to protect surface water (See Appendix 1).

Land Tenure Management--Not addressed except as under Wetlands/Floodplains/Riparian/Coastal Zone.

4. Geologic Hazards

Oil and Gas Leasing--Not addressed.

Oil and Gas Operations--An EA is developed to address mitigation for sour gas, with requirement for a monitoring plan. High pressure zones are addressed in Appendix 1 (i.e., Blowout preventers).

Land Tenure Management--Not addressed.

5. Soils

Oil and Gas leasing--Not addressed.

Oil and Gas Operations--BLM manages impacts to soils on a case-by-case basis as outlined in the Well Site construction Standards in the Appendix 1 (i.e., stockpiling of topsoil, cut and fill requirements, etc.).

Land Tenure Management--BLM manages impacts to soils on a case-by-case basis in the Land Report/EA during lands case application processing. Prime and unique farmlands are addressed in the same way.

6. Areas of Critical Environmental Concern

Oil and gas Leasing--Addressed in Management Common to All Alternatives section of Chapter 2.

Oil and Gas Operations--Same as above.

Land Tenure Management--Same as above.

Non-Issue Related Management

1. Paleontologic Resources

Oil and Gas Leasing--Management outlined in Management Common to All Alternatives Section in Chapter 2.

Oil and Gas Operations--Same as above.

Land Tenure Management--Same as above.

2. Wild and Scenic Rivers

Oil and Gas Leasing--The only Wild and Scenic River in the State is located on the Kisatche National Forest. There are four FMO parcels adjacent to the river and the present USFS management direction allows leasing of oil and gas with NSO.

Oil and Gas Operations--Same as above.

Land Tenure Management--Not Addressed.

3. Air Quality

Oil and gas Leasing--Not addressed.

Oil and Gas Operations--No management direction beyond EPA and OSHA standards.

Land Tenure Management--Not addressed.

4. Vegetation

Oil and Gas Leasing--Not addressed.

Oil and Gas Operations--BLM manages impacts to vegetation on a case-by-case basis as outlined in Appendix 1.

Land Tenure Management--Not addressed.

5. Cultural Resources

Oil and Gas Leasing--BLM follows the procedure for protection of cultural resources outlined in the management common section of this chapter. A stipulation is added to all leases stating that based upon an agreement with the SHPO consultation will be conducted at operations stage and a survey may be required.

Oil and gas Operations--BLM consults with the SHPO prior to approval of any surface disturbing activity. Surveys will be required at the operator's expense on a case-by-case basis as required by the SHPO.

Land Tenure Management--BLM manages impacts to cultural resources on a case-by-case basis. Surveys are completed by the BLM archaeologist as required after SHPO consultation. On non-discretionary lands decisions, the applicant and SHPO are notified if significant resources are discovered. On discretionary lands decisions, where significant resources are found, the preferred transfer method will be to an agency which can protect the resources.

6. Visual Resources

Oil and Gas Leasing--Not addressed

Oil and gas Operations--BLM manages impacts to visual resources on a case-by-case basis in the environmental review process discussed under Operations in the Appendix 1.

Land Tenure Management--Visual resources are addressed on a case-by-case basis during lands case processing.

7. Wilderness

Oil and Gas Leasing--The only wilderness area in the state, the Kisatchie Hills, was withdrawn from mineral entry and leasing in 1983.

Oil and Gas Operations--Not addressed.

Land Tenure Management--The two BLM islands in Louisiana with wilderness potential were inventoried and formal lacking wilderness characteristics.

8. Socio-Economics

Oil and Gas Leasing--No management decisions are made related to Socio-Economics. BLM decisions do impact Socio-Economics, however.

Oil and Gas Operations--Same as above

Land Tenure Management--Same as above.

9. Recreation

Oil and Gas Leasing-- Not addressed except as protected by the surface managing agency.

Oil and Gas Operations--BLM manages impacts to recreation areas on a case-by-case basis during the environmental review process discussed under Operations in the Appendix 2.

Land Tenure Management--All PD lands clear of title conflicts will first be considered for disposal under the Recreation and Public Purposes Act.

10. Transportation

Oil and Gas Leasing--Not addressed.

Oil and Gas Operations--Access road construction is done in accordance with the Construction standards of Appendix 2.

Land Tenure Management--Right-of-Ways (ROW) are considered for roads in trespass on PD tracts clear of title conflicts, or the tracts are considered for transfer to Federal, State, or county for a roadside park and road ROW.

11. Hazardous Wastes

Oil and Gas Leasing--Not addressed.

Oil and Gas Operations--Not addressed.

Land Tenure Management--BLM does not transfer lands for land fills. The inventory of hazardous sanitary waste sites will be maintained and proximity to PD tracts will be discussed in every lands case processed by the JDO.

2. Alternative B (Protection Alternative)

a. Management Emphasis

The protection alternative emphasizes the maintenance or improvement of environmental or cultural values and protection of fragile and unique resources. Land tenure adjustments and mineral leasing and development actions would be permitted to the extent of their compatibility with the environmental protection emphasis. Land tenure decisions under this alternative would favor transfer under the Recreation and Public Purposes Act or withdrawal to another Federal agency which could manage lands in a protective mode.

b. Summary of Management Actions

Issue Related Management

1. Wildlife

Oil and Gas Leasing--Consult with FWS and Louisiana Natural Heritage. Lease with NSO in those areas identified through consultation as being especially important T&E habitat. Other areas which are not as critical, stipulate that site specific surveys and mitigation be developed at APD phase.

All areas identified as wetland or open water that are within the general wintering waterfowl area (Figure 8) will be leased with a seasonal stipulation (i.e., no construction/drilling operations from October 15 - March 1).

Oil and Gas Operations--Informal consultation with USFWS and Louisiana Natural Heritage Commission will be carried out at APD phase. BLM shall perform field reviews of all drill sites where T&E species are known or suspected to occur. Site specific mitigation will be developed to mitigate any negative impacts (in consultation with FWS) to T&E species. Whenever possible, surface reclamation will be accomplished in such a manner as to improve T&E species and wildlife habitat.

No construction or development activities will be allowed from October 15 - March 1 in wetland or open water areas which fall within the general wintering waterfowl area (Figure 8). The remainder of the year, drill site and production facilities will be designed (in consultation with FWS) to minimize impacts to waterfowl habitat.

Land Tenure Management--In all discretionary land tenure decisions, wintering waterfowl habitat (Figure 9) that is wetland or open water will be protected as described in the wetlands discussion through conservation easement, title restriction, etc., or will be transferred to wildlife management agencies.

2. Wetlands/Floodplains/Riparian/Coastal Zone

Oil and Gas Leasing--At leasing phase, include a NSO stip within 300' of perennial streams or water bodies, and NSO within defined streambeds of intermittent streams. NSO stipulation will be employed in all wetland (as defined by USFWS, 1979) areas. Lease applications which appear to be in wetlands will be checked against National Wetland Inventory Maps to determine if NSO stip is appropriate.

Oil and Gas Operations--All APD's will be issued with NSO stips as outlined above. APD's will be field checked prior to approval to assure compliance with the above stipulations.

Land Tenure Management--All discretionary land tenure cases will include patent restrictions/conservation easements, etc., to protect wetland areas. Whenever possible, wetland tracts will be transferred to State or Federal conservation agencies. Public conservation agencies (such as Nature Conservancy) will be contacted if wetland tracts go to public land sale, and State or Federal agencies are unable to acquire the tracts.

3. Water Resources

Oil and Gas Leasing--Surface water will be protected under this alternative in the manner outlined above under Wetlands/Floodplains/Riparian/Coastal Zone. Groundwater is not addressed at leasing stage.

Oil and gas Operations--BLM manages impacts to surface water as outlined in the Wetlands/Floodplains/Riparian/ Coastal Zone section, and impacts to ground water as outlined in Alternative A.

Land Tenure Management--Not addressed except as outlined in Wetlands/Floodplains/Riparian/Coastal Zone.

4. Geologic Hazards

Oil and Gas Leasing--Not addressed.

Oil and Gas Operations--Managed as outlined in Alternative A.

Land Tenure Management--Not addressed.

5. Soils

Oil and Gas Leasing--Not addressed.

Oil and Gas Operations--Impacts to Wetland Soils managed through mitigation outlined in section on Wetlands/ Floodplains/Riparian/Coastal Zone. Other soils impacts during operations will be managed as outlined in the Well Site Construction Standards in Appendix 1.

Land Tenure Management--See Alternative A.

6. Areas of Critical Environmental Concern

Oil and Gas Leasing--Addressed in Management Common to All Alternatives Section of this Chapter.

Oil and Gas Operations--Same as above.

Land Tenure Management--Same as above.

Non-Issue Related Management

1. Paleontological Resources

Oil and Gas Leasing--Management outlined in Management Common to All Alternatives section of this Chapter.

Oil and Gas Operations--Same as above.

Land Tenure Management--Same as above.

2. Wild and Scenic Rivers

Oil and Gas Leasing--Impacts to Wild and Scenic Rivers managed as outlined under Alternative A.

Oil and Gas Operations--Same as above

Land Tenure Management--Same as above

3. Air Quality

Oil and Gas Leasing--Impacts to Air Quality managed as outlined under Alternative A.

Oil and Gas Operations--Same as above.

Land Tenure Management--Same as above.

4. Vegetation

Oil and Gas Leasing--Not addressed except as habitat for Threatened or Endangered species, and as wetlands, floodplains or coastal zone areas.

Oil and Gas Operations--Same as above.

Land Tenure Management--Same as above.

5. Cultural Resources

Oil and Gas Leasing--A No Surface Occupancy (NSO) stipulation will be applied to all leases on FMO located within the " highest priority" cultural areas identified on Figure 15. A stipulation requiring a survey will be applied on all leases on FMO located within "higher priority" areas identified on Figure 15. Consultation with the SHPO will be conducted prior to any leasing.

Oil and Gas Operations--A survey will be required on all areas identified as high priority by the SHPO on Figure 15. Activities on all other areas would still require SHPO consultation on a case-by-case basis.

Land Tenure Management--Impacts to cultural resources would be mitigated as outlined in Alternative A.

6. Visual Resource Management

Oil and Gas Leasing--Not addressed except by Surface Managing Agency (SMA) stipulations.

Oil and Gas Operations--Impacts to Visual Resources managed as outlined in Alternative A.

Land Tenure Management--Same as above.

7. Wilderness

Oil and Gas Leasing--BLM management related to wilderness areas is outlined in Alternative A.

Oil and Gas Operations--Same as above.

Land Tenure Management--Same as above.

8. Socio-Economic

Oil and Gas Leasing--See Alternative A.

Oil and Gas Operations--See Alternative A.

Land Tenure Management--See Alternative A.

9. Recreation

Oil and Gas Leasing--If the area to be offered for lease is adjacent to a recreation area, then stipulations (i.e., seasonal stipulations, buffer zones, noise or visual barriers) will be developed with input from surface managing agencies. NSO stipulations used for FMO located in recreation areas.

Oil and Gas Operations--Same as above.

Land Tenure Management--Managed as outlined in Alternative A.

10. Transportation

Oil and Gas Leasing--Not addressed

Oil and Gas Operations--See Alternative A.

Land Tenure Management--See Alternative A.

11. Hazardous Wastes

Oil and Gas Leasing--Consult EPA-ERRIS printout on each lease action. NSO on all FMO under hazardous waste sites.

Oil and Gas Operations--Same as above.

Land Tenure Management--See Alternative A.

3. Alternative C (Preferred Alternative)

a. Management Emphasis

The Preferred Alternative gives consideration to the resource values from both a State and Federal perspective, but the limitations or required mitigation would not be as great as under the protection alternative. All legislative and regulatory requirements will be met as under the current management alternative, however, this alternative will not be as reactive as Alternative A. As a result of the planning process, a better decision framework will exist for future actions in the State. Lands decisions under this alternative will be consistent with the plan and will consider the resources identified as important during the planning process. Mineral decisions will likewise be consistent with the plan and will be mitigated to protect resources identified as important in the plan.

b. Summary of Management Actions

Issue Related Management

1. Wildlife

Oil and Gas Leasing--Impacts to threatened or endangered species would be managed as outlined in Alternative A, with some additional protective stipulations (see Chapter 4, Alternative C, mitigation).

Wintering waterfowl mitigation is the same as is outlined in Alternative B except that the protective measures will only be applied in "special emphasis areas" in Figure 8.

Oil and Gas Operations--Impacts will be managed as outlined in Alternative A, with additional protective stipulations as outlined in Chapter 4. Field reviews will be performed prior to APD approval whenever consultation indicates a T&E species is present on the site.

Land Tenure Management--Same management as Alternative B.

2. Wetlands/Floodplain/Riparian/Coastal Zone

Oil and Gas Leasing--All leases which encompass perennial streams and water bodies will include a NSO stip within 100' of those water bodies for drill pads and production facilities.

Oil and Gas Operations--NSO within 100' of perennial streams and water bodies for all drill pads and production facilities. Access roads will use best management practices identified in the Appendix 1 when crossing perennial or intermittent streams. Oil and gas operations located in wetland areas will use best available technologies in construction of facilities, will minimize all dredge a fill operations, and will not build new canals if at all possible in order to protect wetland resources. See also wildlife mitigation for wintering waterfowl. All oil and gas operations which may impact riparian or wetland areas will be field checked to assure compliance with the above conditions.

Land Tenure Management--Impacts will be managed as outlined in Alternative A, including the provision that whenever possible wetland tracts will be transferred to State or Federal conservation agencies.

3. Water Resources

Oil and Gas Leasing--Impacts to surface water would be managed as outlined in the section on Wetlands/ Floodplains/Riparian/Coastal Zone. Groundwater resource impacts managed as outlined under Alternative A.

Oil and Gas Operations--See Alternative A.

Land Tenure Management--See Alternative B.

4. Geologic Hazards

Oil and Gas Leasing--Not addressed.

Oil and Gas Operations--See Alternative A.

Land Tenure Management--Not addressed.

5. Soils

Oil and Gas Leasing--Not addressed.

Oil and Gas Operations-See Alternative B.

Land Tenure Management--See Alternative A.

6. Areas of Critical Environmental Concern

Oil and Gas Leasing--See Alternative A.

Oil and Gas Operations--See Alternative A.

Land Tenure Management--See Alternative A.

Non-Issue Related Management

1. Paleontological Resources

   Oil and Gas Leasing--See Alternative A.

   Oil and Gas Operations--See Alternative A.

   Land Tenure Management--See Alternative A.

2. Wild and Scenic Rivers

   Oil and Gas Leasing--See Alternative A.

   Oil and Gas Operations--See Alternative A.

   Land Tenure Management--See Alternative A.

3. Air Quality

   Oil and Gas Leasing--See Alternative A.

   Oil and Gas Operations--See Alternative A.

   Land Tenure Management--See Alternative A.

4. Vegetation

   Oil and Gas Leasing--Not addressed except as habitat for threatened or endangered species, and as wetlands, floodplains, or coastal zone areas.

   Oil and Gas Operations--Same as above.

   Land Tenure Management--Same as above.

5. Cultural Resources

   Oil and Gas Leasing--Prior to leasing FMO within high priority areas on Figure 15 or FMO less than 40 acres in " lower priority" areas, BLM will consult with the SHPO prior to lease issuance. If the SHPO requests a survey, the BLM archaeoligist will survey the tract prior to leasing, and based on findings either recommend no leasing, NSO or other special stipulations to protect the resource. Leasing of other tracts in the "lower priority" areas will continue as outlined in Alternative A.

Oil and Gas Operations--Same as Alternative A.

Land Tenure Management--Same as Alternative A.

6. Visual Resource Management

Oil and Gas Leasing--Not addressed except by SMA stipulation.

Oil and Gas Operations--See Alternative A.

Land Tenure Management--See Alternative A.

7. Wilderness

Oil and Gas Leasing--See Alternative A.

Oil and Gas Operations--See Alternative A.

Land Tenure Management--See Alternative A.

8. Socio-Economics

Oil and Gas Leasing-See Alternative A.

Oil and Gas Operations--See Alternative A.

Land Tenure Management--See Alternative A.

9. Recreation

Oil and Gas Leasing--BLM will consult with the surface managing agency for any recreation area that may be impacted at operational stage to develop lease stipulations.

Oil and Gas Operations--Same as above.

Land Tenure Management--See Alternative A.

10. Transportation

Oil and Gas Leasing--Not addressed.

Oil and Gas Operations--See Alternative A.

Land Tenure Management--See Alternative A.

11. Hazardous Wastes

Oil and Gas Leasing--See Alternative B.

Oil and Gas Operations--See Alternative B.

Land Tenure Management--See Alternative A.

Chapter III

Existing Environment

A. Federal Surface Ownership

1. Overview

The State of Louisiana contains approximately 28,493,440 acres. The Federal Government holds title to approximately 4% of the surface acreage included in this total. The following table depicts this ownership by Federal Agency.

Table 1
Federal Surface Ownership in Louisiana*

Forest Service	597,769 acres*
Fish and Wildlife Service	298,123
U.S. Army	114,994
Corps of Engineers	103,451
U.S. Air Force	22,594
National Park Service	6,699
U.S. Navy	3,505
U.S. Coast Guard	2,624
Bureau of Land Management	4,404
Strategic Petro. Res. Office	1,624
Others	2,092
Total	1,153,658 acres

*Rounded to nearest acre Public Land Statistics 1982 and 1983, USDI, BLM.

Sources: Final Land and Resource Management Plan - Kisatchie National Forest, USDA, FS, 1986.

2. Public Domain--Land Tenure Management

In preparation of this plan, an inventory of public domain lands was prepared from ESO records. Sixty parcels, totaling over 4,400 acres, were inventoried to determine which tracts would be carried forward into the planning process. Of this total, approximately 4,000 acres are encumbered by title conflicts. Two parcels totaling 3.4 acres may have title conflict. The title status of these two parcels has not been verified by ESO. Appendix four gives a listing of all sixty tracts.

Two other parcels present have unique problems. One parcel of 45.72 acres now forms part of the river bed of the Mississippi River. The other parcel of 40 acres is inundated by the Anacoco Lake, a manmade reservoir. The title status of these two parcels has not been determined by ESO.

The inventory was checked against General Land Office tract books and survey plats, National Archives records, Louisiana State land records, and parish tax assessor's and parish recorder's records. This data was collected to verify ownership and to determine the existence and extent of ownership conflicts.

Twelve parcels were identified as being public domain lands with no title conflicts. These parcels are located in six (6) parishes and range in size from 2.36 acres to 140 acres. (See table below.)

Table 2
Public Domain Parcels in Louisiana
With No Title Conflicts

Parish	T.	R.	Sec.	Subdivision	Acres
Acadia	7S.	2W.	14	Lot 4	2.36
Desoto	11N.	12W.	12	Lot 2	21.38
Iberia	12S.	8E.	31		19.08
Natchitoches	12N.	7W.	32	Lots 5,6,8,11,12	135.19
Rapides	5N.	3E.	26		140.0
St. Martin	14S.	11E.	26	Lots 8,9,10	63.59
Vermillion	13S.	3E.	31	Lot 6	30.77
Total					412.37

Two parcels (in St. Mary's and Natchitoches Parishes) have had case files established, and were sent to the Jackson District Office (JDO) for disposal recommendations. Three parcels (in Union, Concordia, and St. Landry Parishes) are the subject of color-of-title applications. Additionally, ESO has requested status information from JDO on another eight parcels (in Morehouse, Plaquemines, St. Martin, St. Mary and West Feliciano Parishes). All of these parcels are included in this analysis.

Each parcel was analyzed for the occurance or the potential for the occurance of the following resources and resource values:

Threatened and Endangered Species
Floodplains and Wetlands
Water Resources
Air Quality
Prime and Unique Farmlands
Cultural and Historic Resources
Wilderness
Wild and Scenic Rivers
Areas of Critical Environmental Concern
Paleontological Resources

In addition, the social and economic environment was discussed. The plan considers disposal of the cleared tracts under various methods. Disposal considerations are made relative to the resource values present. If and when those parcels with title conflicts are cleared of any cloud on the title, they will be incorporated into the plan.

All public domain parcels are considered to have some potential for mineral occurance, especially oil and gas.

As stated in Chapter II, other land tenure management decisions/problems addressed in this analysis include withdrawals, rights-of-way (ROW), trespass (unauthorized use), and special legislation.

As of this writing there are twelve withdrawals totaling almost 305,000 acres. There are four Corps of Engineers projects (2 civil works, 1 dam and reservoir, and a navigation project) totaling 490 acres. There are three US Forest Service withdrawals (2 wildlife management areas, and 1 forestation/reforestation and soil erosion control project) totaling just over 70,000 acres. The US Fish and Wildlife Service has the remaining acreage in five refuges (Breton, Delta, Lacassine, Sabine and Shell Keys).

At this time, there are 13 active BLM ROW's in Louisiana. All are oil and gas pipelines. Ten are in Plaquemines Parish and one each are in Iberville, LaSalle, and Richland Parishes.

A review of each tract on USGS quadrangle 7.5' series maps indicates that there is existing unauthorized use on approximately 10 percent of the PD parcels in Louisiana. There are two active trespass cases in the State, (one occupancy and one ROW).

The occupancy trespass mentioned above is in Bienville and Bossier Parishes and is so extensive that it will probably require special legislation to resolve. The land is adjacent to Lake Bistineau and the trespass takes the form of a subdivision. Special legislation will allow more administrative flexiblity in dealing with the title problems.

B. Federal Mineral Ownership

The table of Federal Surface Ownership in the preceding section gives the outer limits of the possible FMO in the State of Louisiana. An accurate acreage figure cannot be generated at this time. The District Office has,

however, compiled information from various sources which has allowed for the preparation of an FMO map for the State. The map insert entitled Mineral Interest in Louisiana shows the location of all.known FMO by agency on a 1 to 1,000,000 scale. The relative size of the acreage under jurisdiction of the surface management agencies remain the same--U.S. Forest Service, U.S. Fish and Wildlife Service, Military (less Corps), Corps of Engineers, National Park Service and finally BLM. Because FMO is spread throughout the State, the resource discussions in the section which follows are not site-specific, but rather statewide in nature.

C. Resources

1. Mineral Resources

a. Introduction and General Geology and Physiography of Louisiana

Louisiana forms a part of the Gulf Coastal Plain and the Mississippi River Floodplain. The principal physiographic features of the State are the uplands, floodplains and terrace deposits of northern Louisiana, and the uplands, alluvial prairies, wooded plains, bayous and marshlands of southern Louisiana. The area is covered by Quarternary and Tertiary sediments deposited by a former extension of the Gulf of Mexico. Parts of Louisiana are covered by alluvial material deposited by the Mississippi, Red, Ouachita, Atchafalaya and Sabine Rivers. Louisiana sediments are composed of sand, silt, clay, gravel, lignite, shale, sandstone and limestone. In general, the strata dip gently southward toward the Gulf of Mexico.

The chief structural features of Louisiana are the Sabine Uplift, the Angelina Caldwell Flexure and numerous, widely-scattered salt domes. The Sabine Uplift is the most prominent feature of the gulf embayment region, and centers on northwestern Louisiana. The Angelina Caldwell Flexure is a monoclinal flexure and line of weakness that extends in a northeast-southwest direction from Sabine Parish across central Louisiana to Caldwell Parish.

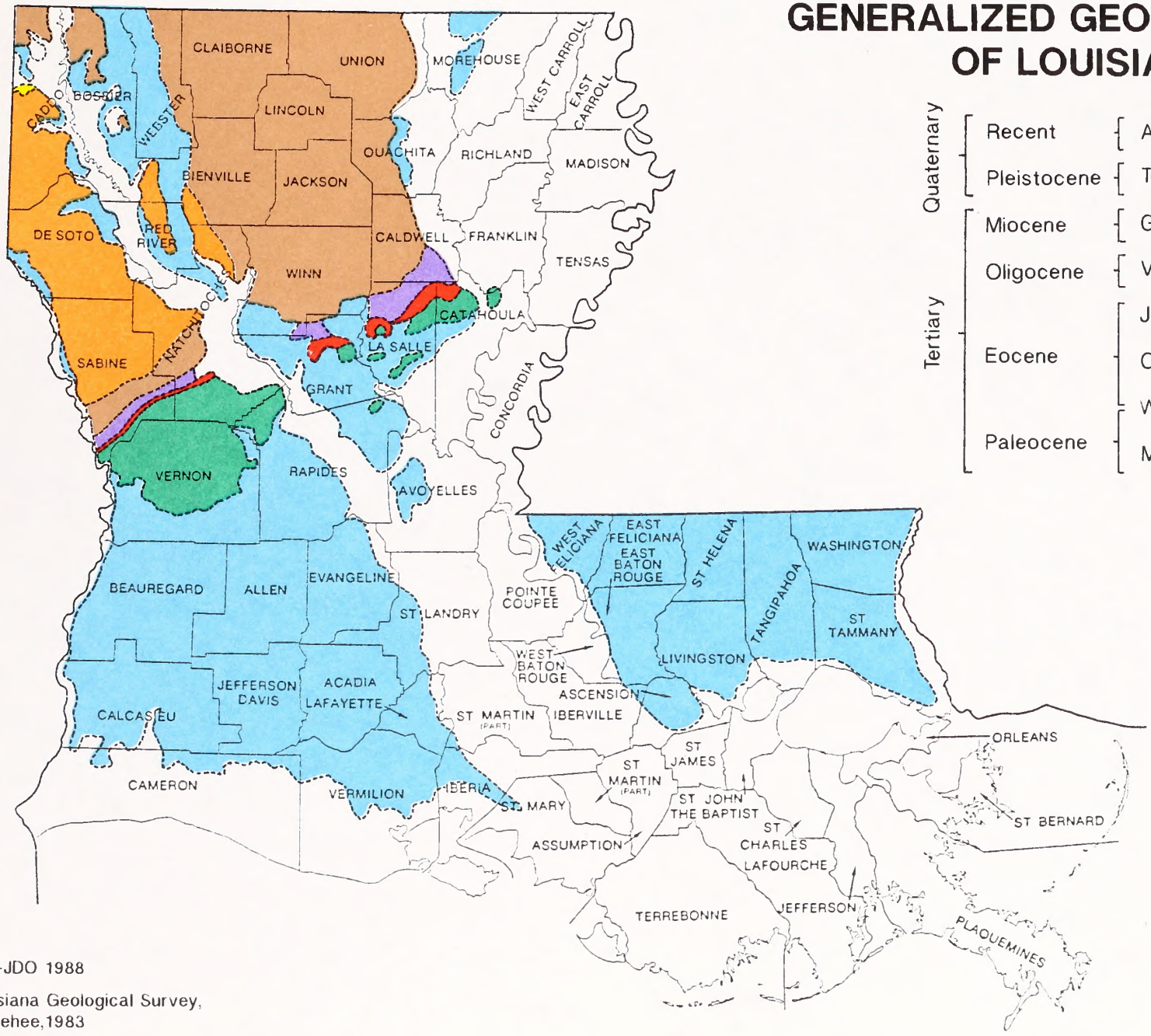
Please see Figure 2, generalized geologic map, and Figure 3, composite columnar section.

b. Louisiana Mineral Resources Currently Being Developed

The major mineral resources of current economic importance in Louisiana are natural gas and oil, salt, sand and gravel, Frasch sulfur, clay, shell, gypsum and anhydrite, and lignite.

Please see Figure 4, map of mineral operations, and Tables 3 - 6, Louisiana mineral production.

GENERALIZED GEOLOGICAL MAP OF LOUISIANA



BLM-JDO 1988

Louisiana Geological Survey,
McGehee,1983

Figure 2

COMPOSITE COLUMNAR SECTION OF LOUISIANA

ERA	SYSTEM	SERIES	GROUP	FORMATION	REMARKS
CENOZOIC	QUATERNARY	HOLOCENE		Recent alluvium	
		PLEISTOCENE		Loess	Forms a veneer on terraces locally.
				Prairie	Fluviatile and coastwise terraces at surface; subsurface marine equivalents downdip zoned on paleontology.
				Montgomery	
				Bentley	
				Williana	
				Citronelle	
	TERTIARY	PLIOCENE			Not recognized at surface except for Citronelle, possibly, in part; zoned in marine subsurface on paleo.
		MIOCENE		Fleming	Subsurface marine beds zoned on paleo — arbitrarily into upper, middle and lower.
				Catahoula	
		OLIGOCENE		Anahuac	Recognized in subsurface only.
				Frio	Mid. Frio (Hackberry) is a subsurface wedge
			Vicksburg	Nash Creek(W) = Rosefield (E)	These are surface units, not subdivided in the subsurface.
				Sandel	
		EOCENE	Jackson	Mosley Hill	Most of these have both surface and subsurface expression.
				Danville Landing	
				Yazoo	
				Moodys Branch	
			Claiborne	Cockfield	
				Cook Mountain	
				Sparta	
				Cane River	
		PALEOCENE	Wilcox	Carrizo	These are surface units; undifferentiated in the subsurface.
				Sabinetown	
				Pendleton	
				Marthaville	
				Hall Summit	
				Lime Hill	
				Converse	
				Cow Bayou	
				Dolet Hills	
				Naborton	
			Midway	Porters Creek	These units are present only very locally at the surface.
				Kincaid	
MESOZOIC	CRETACEOUS	GULF	Navarro*	Arkadelphia	The only Mesozoic sediments (all upper Cretaceous) that have been identified at the surface are those on only a few piercement salt domes in the northern part of the state.
				Nacatoch	
				Saratoga	
			Taylor*	Marlbrook*	
				Annona*	
				Ozan*	
			Austin*	Brownstown*	
				Tokio*	
			Eagle Ford*	Upper #	
				Lower #	
			Tuscaloosa	Upper	
				Middle	
				Lower	
		COMANCHE	Washita*	South Tyler*	Washita units are present primarily within the salt-dome basins of the Interior Salt Basin (subsurface only).
				Buda*	
				Grayson*	
				Main Street*	
				Weno-Pawpaw*	
				Denton*	
				Fort Worth*	
				Duck Creek*	
				Kiamichi*	
			Fredericksburg*	Goodland*	Fredericksburg and upper parts of the Trinity are not present over highest elements of the Sabine Uplift; these and older Comanche units are also absent over highest elements of the Monroe Uplift.
				Paluxy*	
			Trinity*	Rusk*	
				Ferry Lake*	
				Rodessa*	
				James*	
				Pine Island*	
			Coahuila*	Sligo	
				Hosston	
	JURASSIC	UPPER	Cotton Valley*	Dorcheat*	# Units proposed by E. G. Anderson in Basic Mesozoic Study in Louisiana, the Northern Gulf Coastal Region, and the Gulf Basin Province: Louisiana Geological Survey Folio Series No. 3, 1979. * These units are more properly designated as time-stratigraphic rather than rock-stratigraphic, i.e., stage rather than group and substage rather than formation.
				Shongaloo*	
				Bossier*	
			Louark*	Haynesville	
				Smackover	
				Norphlet	
		MIDDLE (LOUISIANA SERIES #)		Louann	
		LOWER (LOUISIANA SERIES #)		Werner	
	TRIASSIC	UPPER		Eagle Mills	

Upper Paleozoics have been encountered to date in two deep wells: Union Producing Co., A-1 Tensas Delta, Morehouse Parish; Exxon, 1-Boise Southern, Sabine Parish.

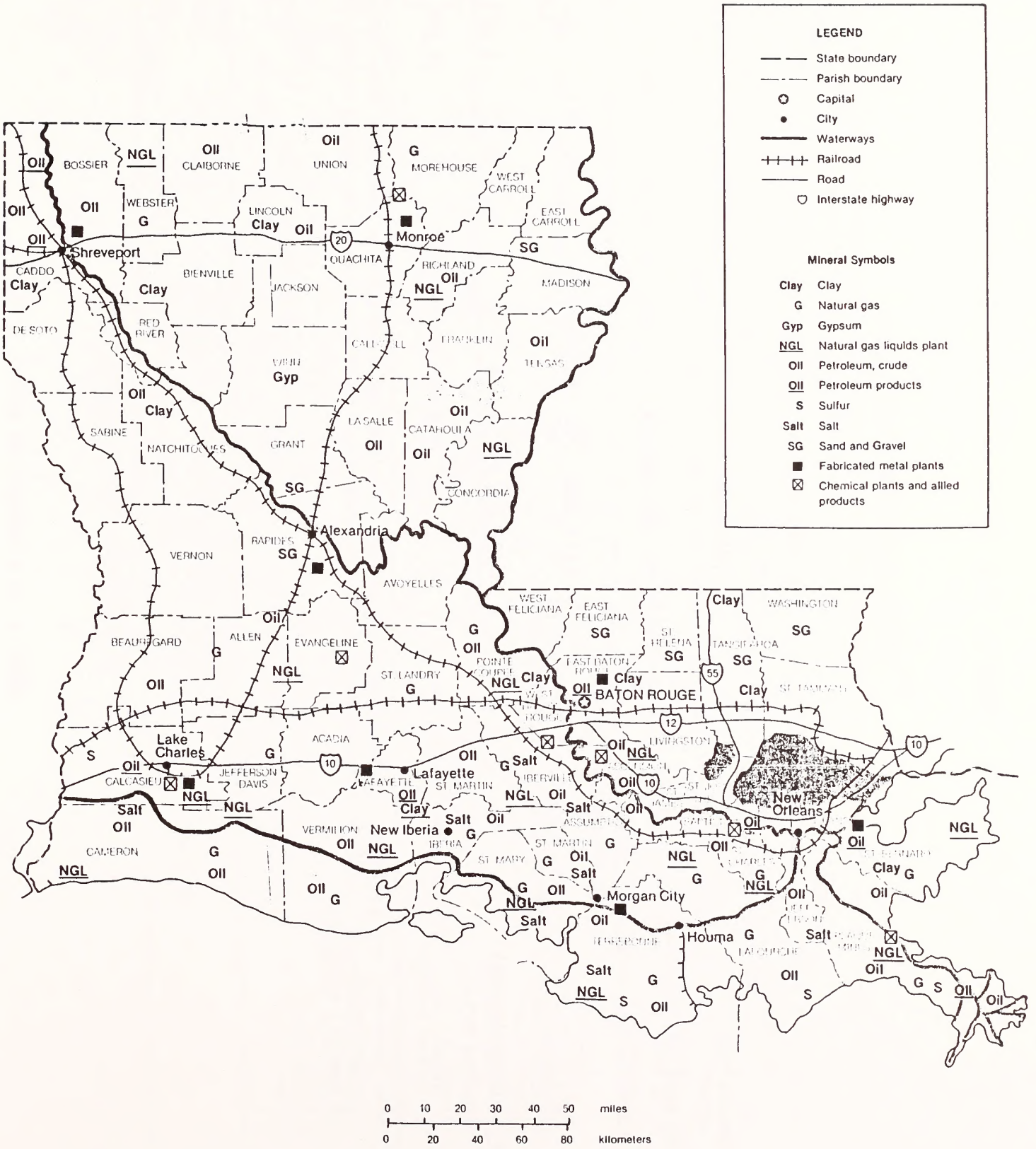
LOUISIANA GEOLOGICAL SURVEY - 1980

Compiled by DAVID E. POPE

(McGehee, 1983)

Figure 3

LOUISIANA
MINERAL OPERATIONS



(U.S. Bureau of Mines, 1979)

Figure 4

TABLE 3 (U.S. Bureau of Mines, 1979)

Fuels production in Louisiana

Mineral	1977		1978	
	Quantity	Value, thousand dollars	Quantity[1]	Value,[1] thousand dollars
Natural gas.....million cubic feet..	7,215,006	5,068,295	7,174,505	6,062,457
Natural gas liquids:				
Natural gasoline and cycle products thousand 42-gallon barrels..	117,763	804,183	112,633	844,748
LP gases.....do.....				
Petroleum (crude).....do.....	562,905	4,689,122	534,478	4,997,369
Total.....	XX	9,561,600	XX	11,904,574

[1]These data are now collected by Department of Energy and were not available at the time this table was prepared. All 1978 data are from preliminary Department of Energy estimates based on the first 8 months' production.

TABLE 4 (U.S. Bureau of Mines, 1979)

Mineral production in Louisiana[1]

Mineral	1977		1978[P]	
	Quantity	Value, thousand dollars	Quantity	Value, thousand dollars
Clays.....thousand short tons..	401	785	429	2,490
Natural gas.....million cubic feet..	7,215,006	5,068,295	([2])	([2])
Natural gas liquids:				
Natural gasoline and cycle products thousand 42-gallon barrels..	117,763	804,183	([2])	([2])
LP gases.....do.....				
Petroleum (crude).....do.....	562,905	4,689,122	([2])	([2])
Salt.....thousand short tons..	13,201	96,878	13,547	97,230
Sand and gravel.....do.....	21,987	50,790	22,000	52,000
Stone (crushed).....do.....	9,710	26,920	10,300	28,500
Sulfur.....thousand metric tons..	2,621	W	2,098	W
Combined value of cement (masonry and portland), gypsum, lime, and items indicated by symbol W.	XX	174,912	XX	148,735
Total.....	XX	10,911,885	XX	[3]328,955

[P]Preliminary. XX Not applicable.

W Withheld to avoid disclosing individual company confidential information; value included in "Combined value" figure.

[1]Production as measured by mine shipments, sales, or marketable production (including consumption by producers).

[2]These data now collected by U.S. Department of Energy; not available at the time this table was prepared.

[3]Incomplete total; excludes value of natural gas, natural gas liquids, and petroleum.

TABLE 5 (U.S. Bureau of Mines, 1979)

Louisiana's role in U.S. mineral supply, 1978

Commodity	Share of U.S. output, percent	Rank in Nation	Reserves
Cement (portland)	W	23	Small.
Clays.....	1	27	Large.
Gypsum (crude)...	W	19	Moderate.
Lime.....	W	15	Small.
Salt.....	31	1	Large.
Sand and gravel..	2	13	Small.
Stone (crushed)..	1	28	Do.
Sulfur (Frasch)..	19	2	Moderate.

Value of mineral production in Louisiana, by parish [1 2]

(Thousands)

Parish	1974	1976	Minerals produced in 1975, in order of value
Acadia	$166,836	$163,462	Natural gas liquids, natural gas, petroleum.
Allen	8,620	8,976	Petroleum, natural gas, sand and gravel, natural gas liquids.
Ascension	86,886	82,116	Natural gas liquids, petroleum, salt, natural gas.
Assumption	44,260	61,909	Natural gas, petroleum, salt.
Avoyelles	6,636	6,333	Petroleum, natural gas.
Beauregard	11,647	11,660	Petroleum, sand and gravel, natural gas, natural gas liquids.
Bienville	17,879	22,166	Natural gas, petroleum, clays.
Bossier	33,679	36,766	Natural gas, petroleum, natural gas liquids, sand and gravel.
Caddo	36,622	36,122	Petroleum, natural gas, natural gas liquids, clays.
Calcasieu	91,676	84,876	Petroleum, natural gas liquids, natural gas, salt, lime, stone.
Caldwell	W	W	Natural gas.
Cameron	689,063	671,737	Natural gas, petroleum, natural gas liquids, salt.
Catahoula	16,640	W	Petroleum, sand and gravel, natural gas.
Claiborne	34,662	36,163	Petroleum, natural gas, natural gas liquids.
Concordia	23,321	22,978	Do.
De Soto	16,601	17,281	Natural gas, petroleum.
East Baton Rouge	20,360	12,369	Sand and gravel, petroleum, cement, lime, natural gas, clays.
East Carroll	260	W	Sand and gravel, petroleum.
East Feliciana	W	618	Sand and gravel.
Evangeline	20,383	20,180	Petroleum, natural gas, natural gas liquids.
Franklin	2,361	2,318	Petroleum, natural gas.
Grant	7,914	6,634	Petroleum, sand and gravel, natural gas.
Iberia	432,670	469,761	Natural gas, petroleum, salt, natural gas liquids.
Iberville	73,077	70,084	Petroleum, salt, natural gas, natural gas liquids.
Jackson	1,314	1,587	Natural gas, petroleum.
Jefferson	626,343	647,223	Petroleum, natural gas, sulfur, natural gas liquids, salt.
Jefferson Davis	62,233	67,196	Natural gas, petroleum, natural gas liquids, sand and gravel.
Lafayette	21,751	24,830	Do.
Lafourche	582,091	683,386	Petroleum, natural gas, sulfur, natural gas liquids.
La Salle	34,770	33,821	Petroleum, natural gas, sand and gravel.
Lincoln	13,262	15,348	Natural gas, natural gas liquids, petroleum, clays.
Livingston	--	W	Sand and gravel.
Madison	W	W	Do.
Morehouse	13,125	W	Natural gas, petroleum.
Natchitoches	58,306	61,326	Petroleum, natural gas, natural gas liquids, clays.
Orleans	29,876	38,333	Cement, stone, lime, natural gas, petroleum.
Ouachita	11,146	W	Natural gas, sand and gravel, petroleum.
Plaquemines	1,682,763	1,697,169	Petroleum, natural gas, sulfur, natural gas liquids, salt.
Pointe Coupee	33,706	33,210	Petroleum, natural gas, natural gas liquids, clays.
Rapides	8,166	W	Petroleum, sand and gravel, natural gas.
Red River	427	380	Natural gas, sand and gravel, petroleum.
Richland	47,631	46,968	Petroleum, natural gas liquids, natural gas.
Sabine	1,357	W	Petroleum, natural gas.
St. Bernard	90,183	91,676	Natural gas liquids, petroleum, natural gas, clays.
St. Charles	129,800	127,781	Petroleum, natural gas, natural gas liquids.
St. Helena	W	W	Sand and gravel, clays.
St. James	$24,391	$24,418	Petroleum, natural gas, natural gas liquids.
St. John the Baptist	9,770	W	Petroleum, natural gas.
St. Landry	52,705	60,806	Natural gas, petroleum, natural gas liquids.
St. Martin	95,802	97,852	Petroleum, natural gas, salt, natural gas liquids, clays.
St. Mary	961,699	1,016,690	Petroleum, natural gas, natural gas liquids, stone, salt, lime.
St. Tammany	12,405	W	Stone, sand and gravel, clays.
Tangipahoa	W	W	Sand and gravel, petroleum, clays.
Tensas	4,721	4,890	Petroleum, natural gas.
Terrebonne	1,196,121	1,265,688	Petroleum, natural gas, natural gas liquids, sulfur, salt.
Union	2,906	3,051	Petroleum, natural gas.
Vermilion	506,944	669,723	Natural gas, petroleum, natural gas liquids, sand and gravel.
Vernon	r W	W	Sand and gravel, natural gas.
Washington	1,748	2,938	Sand and gravel.
Webster	40,866	43,636	Natural gas, natural gas liquids, petroleum, sand and gravel.
West Baton Rouge	8,656	8,117	Petroleum, natural gas, clays.
West Feliciana	W	W	Sand and gravel.
Winn	6,012	6,103	Petroleum, stone, gypsum, natural gas.
Undistributed [3]	136,952	219,164	
Total [4]	8,146,678	8,613,275	

r Revised. W Withheld to avoid disclosing individual company confidential data; included with "Undistributed."

[1] Values for petroleum and natural gas are based on an average price per barrel for the State.

[2] No production was reported for West Carroll Parish.

[3] Includes some petroleum and natural gas that cannot be assigned to specific counties and values indicated by symbol W.

[4] Data may not add to totals shown because of independent rounding.

(Jones and Hough, 1975)

TABLE 6

Natural Gas and Oil

(1) Development History and Current Situation. Production of oil and natural gas in Louisiana began in 1902 and 1905, respectively, in the southern part of the State. Currently, out of Louisiana's 64 parishes, 62 (West Carroll and East Carroll Parishes excluded) produce gas and/or oil, which together account for 96.8 percent of the value of all minerals produced in Louisiana. Louisiana is the second-largest energy-producing State in the nation, and oil and natural gas produced within the State furnish essentially all of Louisiana's energy needs.

At the end of 1981, there were 25,320 producing oil wells and 12,763 producing gas and gas distillate wells in Louisiana, the majority of them in the northern part of the State, and 56 percent of Louisiana's total land area was either proven productive or a least under lease. Between 1902 and 1982, 156,650 oil and gas wells were drilled in Louisiana, out of which 58,309 were dry; in 1981 alone, over 5,500 oil and gas well were drilled. As of 1980, it was estimated that 2,751 million barrels of oil, 1,346 million barrels of natural gas liquids and 48,385 billion cubic feet of natural gas proven reserves remained in Louisiana.

Please see insert map entitled "Proximity of Federal Mineral Interest to Oil and Gas Fields in Louisiana", and Table 7, production and revenues from onshore Federal oil and gas leases.

(2) Future Potential. Discoveries of new oil and gas reserves in Louisiana are currently not keeping pace with production; as a result, statewide reserves are gradually being depleted. It is predicted, however, that Louisiana will maintain its place as a national energy leader for the foreseeable future, and that Louisiana oil and gas will continue to have high development potential.

(3) Implications for Federal Mineral Ownership (FMO). There are at present approximately 600 active onshore Federal oil and gas leases for lands in Louisiana, comprising approximately 282,000 acres, of which 115 (60,000 acres) are producing. It is expected that industry interest in Federal oil and gas ownership in Louisiana will continue to be generally high, and will likely increase from current levels once oil and gas prices rise from their presently depressed levels. Oil and gas are by far the Federal Government's most extensive and valuable mineral assets in Louisiana, and hold the highest potential for future development. Please see insert map entitled "proximity of Federal Mineral Interest to Oil and Gas Fields in Louisiana".

Salt

(1) Development History and Current Situation. The greatest salt deposits in the United States were discovered through drilling and geophysical exploration in Louisiana. The first major discovery was made at Avery Island in Iberia Parish in 1862.

Some salt deposits rise above the lowlands as so-called "islands"; others are deeply buried beneath thick Quaternary and Tertiary sediments. The salt does not occur in regular beds, but rather as

TABLE 7 (Minerals Management Service, 1984)

SUMMARY BY STATE AND COMMODITY OF VOLUME, VALUE, ROYALTIES AND OTHER REVENUES FROM ONSHORE FEDERAL MINERAL LEASES, 1920-84

LOUISIANA	OIL IN BARRELS Volume	OIL IN BARRELS Market Value	OIL REVENUES RECEIVED	GAS IN MCF Volume	GAS IN MCF Market Value	GAS REVENUES RECEIVED
1920-79	145,655,048	$510,067,485	$ 60,658,840	1,397,105,638	$257,962,007	$ 37,390,233
1980	2,054,703	30,427,595	3,583,097	17,955,861	14,666,618	1,932,802
1981	1,464,854	51,622,050	5,686,906	15,512,606	13,040,634	1,761,926
1982	1,734,145	45,220,999	5,913,809	17,177,498	19,944,754	2,599,118
1983	2,004,500	59,132,750	7,391,594	15,459,300	23,807,322	3,102,094
1984	1,497,969	44,239,467	5,572,088	15,064,559	19,262,162	2,478,550
1920-84	154,411,219	$740,710,346	$ 88,806,334	1,478,275,462	$348,683,497	$ 49,264,723

	OTHER PRODUCTION Volume	OTHER PRODUCTION Market Value	OTHER REVENUES RECEIVED	TOTAL REVENUES ALL MINERALS	
1920-79	N/A	$ 40,622,159	$ 6,609,649	1920-79	$104,658,722
1980	N/A	5,788,422	912,874	1980	6,428,773
1981	N/A	7,024,299	1,072,336	1981	8,521,168
1982	N/A	7,194,180	1,026,086	1982	9,539,013
1983	N/A	6,330,000	902,800	1983	11,396,488
1984	N/A	6,210,495	867,694	1984	8,918,332
1920-84	N/A	$ 73,169,555	$ 11,391,439	1920-84	$149,462,496

enormous subterranean domes surrounded on all sides by steeply-dipping sands and clays. In addition to salt, oil, gas and sulfur are often found in the areas of these domes.

Louisiana is currently the top-ranked United States salt producer out of 16 salt-producing States, accounting for 30 percent of the national total, and salt is Louisiana's most valuable mineral product after gas and oil. Production consists of rock salt, brine and evaporated salt. Although numerous deep salt domes are known to exist, five underground salt operations represent the major underground mines in the State. This salt is mined from five near-surface intrusive salt domes known as the Five Islands: Jefferson Island (Iberia Parish), Avery Island (Iberia Parish), Weeks Islands (Iberia Parish), Cote Blanche Bay Island (St. Mary Parish), and Belle Isle (St. Mary Parish). These domes each extend more than 25,000 feet into the subsurface, are more than 1 mile in diameter, and represent vast quantities of salt reserves. Salt is also recovered at twelve other operations in nine other parishes.

Salt is primarily used by the chemical and allied industries, and for water softening, agriculture and food processing. A minor amount is consumed as table salt.

Please see Figure 5, map of salt domes.

(2) Future Potential. Although the strength of the salt market has varied somewhat over the past 5 years, the price of salt over that time has remained strong. Salt continues to be a necessary industrial commodity, and Louisiana's salt reserves are virtually unlimited, even at the State's current production rate of 13 million tons per year. For these reasons, it is predicted that salt in Louisiana will continue to have a very high development potential for many years to come.

(3) Implications for FMO. No Federal use authorizations have yet been issued for salt in Louisiana; however, it is highly likely that salt is present on at least some Federal parcels, particularly where oil and gas are being removed from traps resulting from dome-type structures. The development potential of any Federal salt would depend heavily on its distance from the surface, and, in some cases, the feasibility of its being mined in those areas where oil and gas operations are also being conducted.

Sand and Gravel

(1) Current Situation. Sand and gravel are Louisiana's fourth-ranked mineral product, after gas, oil and salt, and its first-ranked construction material in terms of value. The deposits are composed almost entirely of chert, quartz and related silica minerals, with

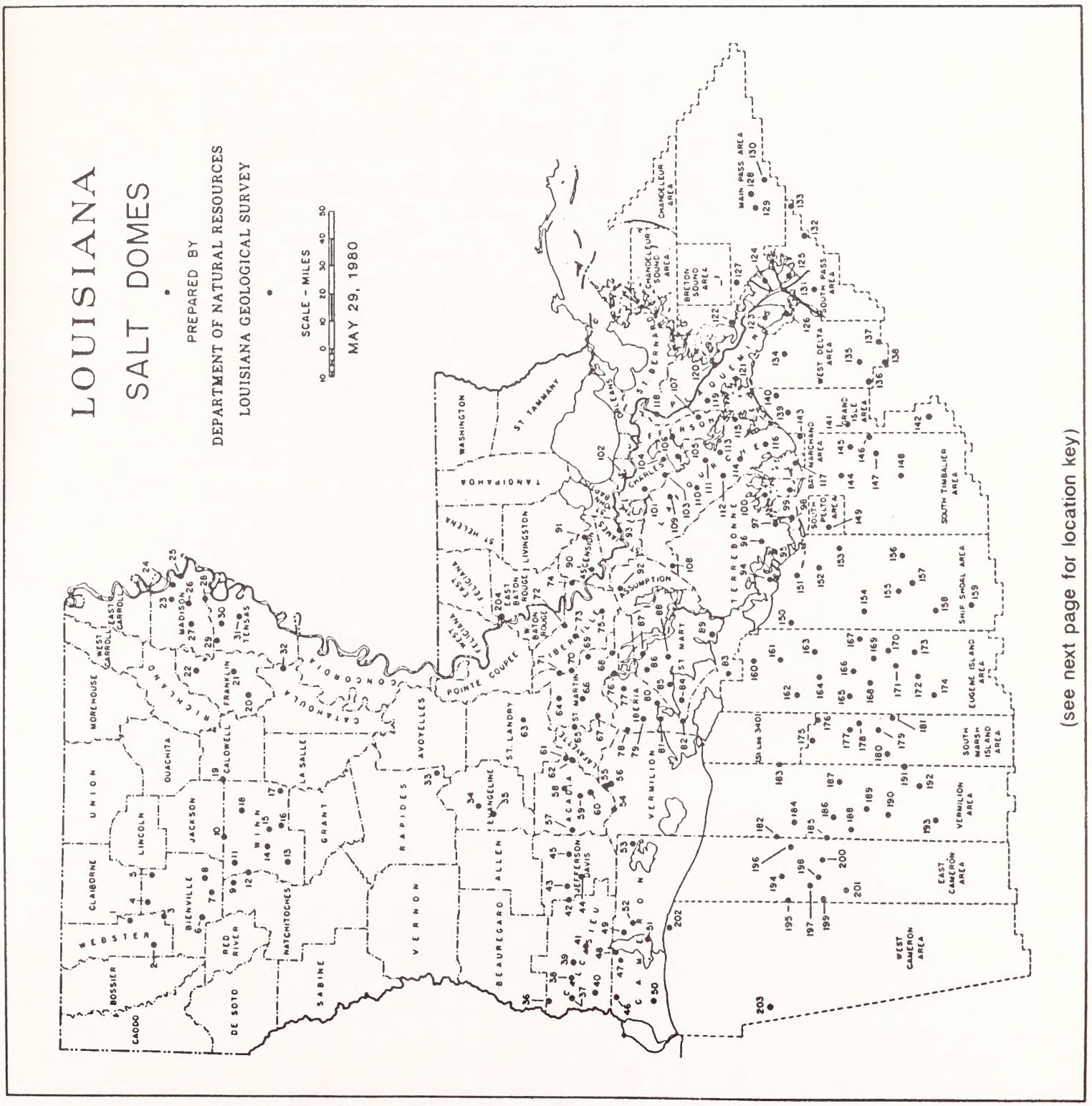

LOUISIANA
SALT DOMES
PREPARED BY
DEPARTMENT OF NATURAL RESOURCES
LOUISIANA GEOLOGICAL SURVEY
SCALE - MILES
MAY 29, 1980
(see next page for location key)

Figure 5

Location key for FIGURE 5

WEBSTER PARISH
1. Minden 19N- 8W
*2. Bistineau 18N-10W

BIENVILLE PARISH
*3. Vacherie 17N- 8W
*4. Gibsland 18N- 7W
*5. Arcadia 18N- 5W
*6. Kings 15N- 8W
*7. Prothro 14N- 6W
*8. Ravburns 15N- 5W

NATCHITOCHES PARISH
*9. Chestnut 13N- 6W

WINN PARISH
*10. Milams 13N- 3W
*11. Prices 13N- 4W
*12. Drakes 12N- 5W
*13. Coochie Brake 10N- 4W
*14. Winnfield 11N- 3W
*15. Cedar Creek 11N- 2W
*16. Packton 10N- 2W
*17. Castor Creek 10N- 1E
*18. Sikes 12N- 1W

CALDWELL PARISH
*19. Chester 13N- 2E

FRANKLIN PARISH
*20. Fort Necessity 12N- 7E
*21. Gilbert 13N- 8E
*22. Crowville 15N- 8E

MADISON PARISH
*23. North Tallulah 17N-13E
*24. Walnut Bayou 17N-13E
*25. Duck Port 16N-14E
*26. Tallulah 16N-12E
*27. Singer 15N-11E
*28. Soy B Coleman 15N-13E

TENSAS PARISH
*29. Snake Bayou 14N-10E
*30. Somerset 14N-11E
*31. Newellton 13N-12E

CATAHOULA PARISH
*32 Foules 10N- 8E

RAPIDES PARISH
33. Cheneyville 1S- 2E

EVANGELINE PARISH
34. Pine Prairie 3S- 1W
35. Reddell 4S- 1W

CALCASIEU PARISH
36. North Starks 8S-13W
37. Starks 9S-12W
38. Edgerly 9S-11W
39. Sulphur Mines 9S-10W
40. Vinton 10S-12W
41. Lockport 10S- 9W

JEFFERSON DAVIS PARISH
42. Iowa 9S- 6W
43. Woodlawn 9S- 6W
44. Welsh 9S- 5W
45. Roanoke 9S- 4W

CAMERON PARISH
46. Black Bayou 12S-12W
47. Hackberry, West .. 12S-10W
48. Hackberry, East .. 12S- 9W
49. Big Lake 12S- 8W
50. Cameron Meadows. 14S-13W
51. Calcasieu Lake 13S- 9W
52. Sweet Lake 13S- 8W
53. Mallard Bay 12S- 3W

VERMILION PARISH
54. Gueydan 11S- 1W
55. Perry Point 11S- 1E
56 Leleux 11S- 2E

ACADIA PARISH
57. Jennings 9S- 2W
58. North Crowley 9S- 1E
59. Lawson 9S- 1E
60. Crowley 10S- 1E
61. Bosco 8S- 3E
62. Bosco, South 9S- 3E

ST. LANDRY PARISH
63. Port Barre 6S- 5E

ST. MARTIN PARISH
64. Plumb Bob 8S- 7E
65. Anse la Butte 9S- 5E
66. Section "28" 9S- 7E
67. St. Martinville 10S- 6E
68. Lake Chicot 11S-10E
69. Lake Mongoulois .. 10S- 9E
70. Bayou Bouillon 9S- 8E

IBERVILLE PARISH
71. Bayou des Glaises . 8S- 8E
72. Bayou Choctaw 9S-11E
73. Bayou Bleu 9S-10E
++ 74. St. Gabriel 9S- 2E
75. White Castle 11S-12E

IBERIA PARISH
76. Fausse Pointe 11S- 8E
77. Iberia 12S- 7E
78. Jefferson Island ... 12S- 5E
79. Avery Island 13S- 5E
80. Weeks Island 14S- 6E
81. South Tigre Lagoon 14S- 5E
82. Vermilion Bay 16S- 5E
83. Rabbit Island ..... Gulf

ST. MARY PARISH
84. West Cote Blanche Bay 16S- 7E
85. Cote Blanche Island .. 15S- 7E
86. Jeanerette 13S- 9E
87. Charenton 13S- 9E
88. Franklin 14S- 9E
89. Belle Isle 17S-10E

ASCENSION PARISH
++ 90. Darrow 10S- 2E
++ 91. Sorrento 10S- 4E

ASSUMPTION PARISH
92. Napoleonville 12S-13E

ST. JAMES PARISH
++ 93. Hester-Vacherie 12S- 5E

EAST BATON ROUGE
++204. Port Hudson 4S- 2W

TERREBONNE PARISH
94. Bay Junop 21S-14E
95. Dog Lake 21S-16E
96. Four Isle Dome 21S-16E
97. Bay St. Elaine 22S-18E
98. Lake Pelto 23S-18E
99. Caillou Island 23S-20E
100. Lake Barre 21S-20E

ST. CHARLES PARISH
101. Paradis 14S-20E
102. Good Hope 12S- 8E
103. Bayou des Allemands 15S-20E
104. Bayou Couba 15S-21E
105. Lake Salvador 16S-22E

JEFFERSON PARISH
106. Barataria 16S-23E
107. Lafitte 17S-24E

LAFOURCHE PARISH
108. Chacahoula 15S-15E
109. Raceland 15S-19E
110. Valentine 17S-20E
111. Cut off 18S-21E
112. Bully Camp 18S-20E
113. Clovelly 18S-22E
114. Golden Meadow 19S-22E
115. Bay de Chene 19S-24E
116. Leeville 21S-22E
117. Timbalier Bay 23S-21E

PLAQUEMINES PARISH
118. Stella 14S-24E
119. Lake Hermitage 18S-25E
++120. Potash 18S-15E
121. Lake Washington ... 20S-26E
++122. Quarantine Bay 19S-17E
123. Venice 22S-30E
++124. Delta Duck Club 21S-20E
125. Garden Island Bay .. 23S-32E
126. West Bay 23S-30E

OFFSHORE

MAIN PASS AREA
127. BL. 46
128. BL. 144
129. BL. 299
130. BL. 306

SOUTH PASS AREA
131. BL. 27
132. BL. 61
133. BL. 62

WEST DELTA AREA
134. BL. 30
135. BL. 133
*136. BL. 138
*137. BL. 148
138. BL. 152

GRAND ISLE AREA
139. BL. 16
140. BL. 18
141. BL. 72
142. BL. 106

BAY MARCHAND AREA
143. BL. 2

SOUTH TIMBALIER AREA
144. BL. 54
145. BL. 86
146. BL. 131
147. BL. 135
148. BL. 176

SOUTH PELTO AREA
149. BL. 20

SHIP SHOAL AREA
150. BL. 32
151. Coon Point (Blk. 39)
152. BL. 72
153. BL. 113
154. BL. 154
155. BL. 204
156. BL. 208
157. BL. 230
158. BL. 274
159. BL. 323

EUGENE ISLAND AREA
160. BL. 32
161. BL. 77
162. BL. 110
163. BL. 126

EUGENE IS. CONT'D
164. BL. 128
165. BL. 175
166. BL. 184
167. BL. 188
168. BL. 205
169. BL. 208
170. BL. 231
171. BL. 238
172. BL. 273
173. BL. 276
174. BL. 292

SOUTH MARSH ISLAND AREA
175. BL. 6
176. BL. 8
177. BL. 38
178. BL. 48
179. BL. 66
180. BL. 73
181. BL. 79

VERMILION AREA
182. BL. 102
183. BL. 111
184. BL. 120
185. BL. 162
186. BL. 164
187. BL. 193
188. BL. 200
189. BL. 218
190. BL. 245
191. BL. 271
192. BL. 289
193. BL. 304

EAST CAMERON AREA
*194. BL. 115
195. BL. 118
196. BL. 126
197. BL. 149
*198. BL. 151
*199. BL. 155
200. BL. 160
201. BL. 189

WEST CAMERON AREA
202. BL. 2
*203. BL. 306

*Non-producing salt domes
++St. Helena Meridian

TOTAL NUMBER OF SALT DOMES - 204

quartz slightly more abundant as a component in eastern Louisiana sand and gravel than in those of western Louisiana. With few exceptions, the deposits are confined to areas of Pleistocene and Recent alluvial sediments which have been uplifted and dissected. Areas occupied by Tertiary out-crops are gravel-barren, with a few sand bodies of inferior quality. In general, the area of major exposures is confined to a belt through central Louisiana, from the Sabine River on the west to the Pearl River on the east, with additional trends extending up the major streams to the north.

Although almost all Louisiana parishes contain some sand and gravel deposits, many only produce small amounts of pit-run material for local use. In addition, the Louisiana gravel supply has become a matter of some concern in recent years since some gravel-producing areas are becoming depleted. Future large-volume construction projects in Louisiana may experience difficulty in obtaining adequate supplies from in-state sources. Gravel shortages have already delayed completion of certain construction projects and have forced contractors to haul the material increasing distances at a cost of both time and money. The few remaining large gravel deposits are in southeastern Louisiana, although they too are expected to be depleted within the next few years.

Currently, construction sand, and to a much lesser degree, gravel, are being mined at 80 operations from approximately 100 pits. Output is being recovered from 24 parishes, of which St. Helena, St. Tammany, East Baton Rouge, Webster and Washington each annually yield more than one million tons. St. Helena Parish alone produces approximately 20 percent of Louisiana's total output. Industrial sand is currently being produced in East Baton Rouge, Webster, Allen and Red River Parishes.

Construction sand and gravel are used for concrete aggregate and other concrete products, road bases and fill, and for snow and ice control. Industrial sand is primarily used in filtration and as an abrasive.

(2) Future Potential. Because of limited construction activity and great supply, prices for construction sand reached a low at the end of 1982. Prices began to rise to current levels after that point, and projections are that they will remain steady for the next few years. These same price trends are true for industrial sand. As stated, however, gravel supplies are expected to decrease; as a result, gravel prices are expected to significantly increase.

(3) Implications for FMO. Because Louisiana has such large supplies of construction and industrial sands, it is unlikely that federally-owned sand will have any potential for significant development unless it is in extremely close proximity to a particular construction project or other potential user. Federal gravel holds much more development potential since gravel is becoming a scarce commodity in Louisiana. All Louisiana FMO should be considered as having potential for deposits of sand and/or gravel.

Frasch Sulfur

(1) Development History and Current Situation. Sulfur was first commercially produced in Louisiana in 1905 at Sulphur, Louisiana (Calcasieu Parish). The sulfur produced in the Gulf Coast region is drawn exclusively from the caprock of salt domes; however, not all salt domes have caprock, and of those that do, only a few contain sulfur in commercial quantities.

The Sulphur Dome of Calcasieu Parish was the first salt dome in the Gulf Coast region from which sulfur was mined commercially. Much difficulty was initially experienced in extraction of the sulfur at this site. As a result, it was not until Herman Frasch, a chemical engineer, perfected a viable extraction technique ("the Frasch process") that elemental Gulf Coast sulfur could be economically retrieved. The Frasch process is now used in all Gulf Coast sulfur mines.

Louisiana is currently ranked second nationwide in Frasch sulfur output, and fifth in recovered elemental sulfur production, accounting for approximately 20 percent of the national total. Sulfur is currently being mined by one company with operations in Jefferson, Plaquemines and Terrebonne Parishes. Eight oil companies are also extracting small amounts of sulfur from salt domes as part of their petroleum operations in seven parishes.

(2) Future Potential. Over the past 5 years, the national sulfur market has weakened considerably as a result of cutbacks in demand. In 1982, for example, Louisiana sulfur output slumped to its lowest level since 1946, and some companies have been forced to close mines as a result of the declining quality of remaining reserves and sharply increased production costs at some sites. For these reasons, the outlook for Louisiana sulfur will depend directly on nationwide sulfur market trends.

(3) Implications for FMO. There are currently no Federal sulfur leases in effect in Louisiana. As indicated for salt, it is likely that some Federal oil and gas operations in salt dome areas will encounter or be in close proximity to sulfur deposits. The development potential of any Federal sulfur will depend heavily on it distance from the surface, the quantities present in individual deposits, and trends in the national sulfur market.

Clay

(1) Current Situation. Louisiana has large supplies of good, commercial-grade clays of many varieties, according to testing performed jointly by the Louisiana Geological Survey and the U.S. Bureau of Mines. Although clay is found in at least seventeen parishes in Louisiana, the most extensive, marketable deposits are in Pointe Coupee, St. Bernard, St. Helena, East Baton Rouge, Claiborne and Caddo Parishes. Currently, six companies are producing clay from eight mines in these parishes. The vast majority of the clay produced is classified as "common clay," but other Louisiana clays include bentonite and Fuller's earth. These clays are used primarily in lightweight aggregate, cement and brick manufacture, and clarification of mineral and vegetable oils.

(2) Future Potential. Although between 1979 and 1982 the Louisiana clay industry and clay mining itself were at an ebb, clay demand began to increase after 1982 as the cement, brick, and general construction industries took an upturn. Clay prices are currently strong, and it is expected that this situation will continue.

(3) Implications for FMO. As with Louisiana sand, the State has such large supplies of clay that it is unlikely that federally-owned clay will have any potential for significant development unless it is extremely close to a potential user. All Louisiana FMO should be considered as having potential for deposits of clay.

Shell

(1) Current Situation. Louisiana clam and oyster shell is dredged from dead shell reefs in bays and near-Gulf lakes. It is mainly used as a raw material for both cement and lime production.

(a) Cement: Portland cement accounts for the majority of cement produced in Louisiana, with masonry cement making up the remainder. Ready-mix companies, and

highway and other contractors use approximately 75 percent of the portland cement produced. Other users include building material dealers and concrete product manufacturers.

(b) Lime: Lime was originally obtained through burning of limestone located in the upper portion of salt dome caprock. This process achieved an approximate yield of one ton of lime for every two tons of rock burned. Lime is currently produced through calcining of oyster and clam shell. Its principal uses are in chemical plants, aluminum smelters and water purification facilities.

Shell is also used in concrete aggregate, road construction, paint and rubber fillers and plant food.

(2) Future Potential. Over the past 5 years, Louisiana's cement and lime industries have fluctuated in terms of output, demand, and production costs. Prices for cement decreased during this time, although lime prices remained strong, even rising slightly in some years. It is anticipated that these industries are now on the upswing as a result of decreased fuel costs and greater demand by the construction and chemical industries.

(3) Implications for FMO. The Federal Government is unlikely to own much of Louisiana's shell, since it is primarily confined to offshore areas and near-Gulf lakes. If some shell is located on onshore FMO, its potential for development would depend heavily on its location with respect to potential markets, since transportation costs would quickly outstrip its value as a mineral commodity.

Gypsum and Anhydrite

(1) Development History and Current Situation. Gypsum and anhydrite are found in several places in Louisiana; however, they are obtainable only from the caprock of relatively near-surface intrusive salt domes. In the past, this caprock has been mined in Winn and Evangeline Parishes, although primarily for limestone and lime production. There is currently only one active Louisiana stone quarry, located in Winn Parish; however, there are also several active operations that process imported stone. The gypsum-anhydrite product is used as a retarder in portland cement.

(2) Future Potential. In terms of demand, the gypsum-anhydrite market in Louisiana is heavily dependent on construction industry trends and subsequent portland cement requirements.

Prices, however, have often risen at times when demand and output have dropped, thus more or less maintaining total income for producers. It is expected that the gypsum-anhydrite market will continue to improve over the next few years, perhaps encouraging development of the caprock of additional Louisiana salt domes.

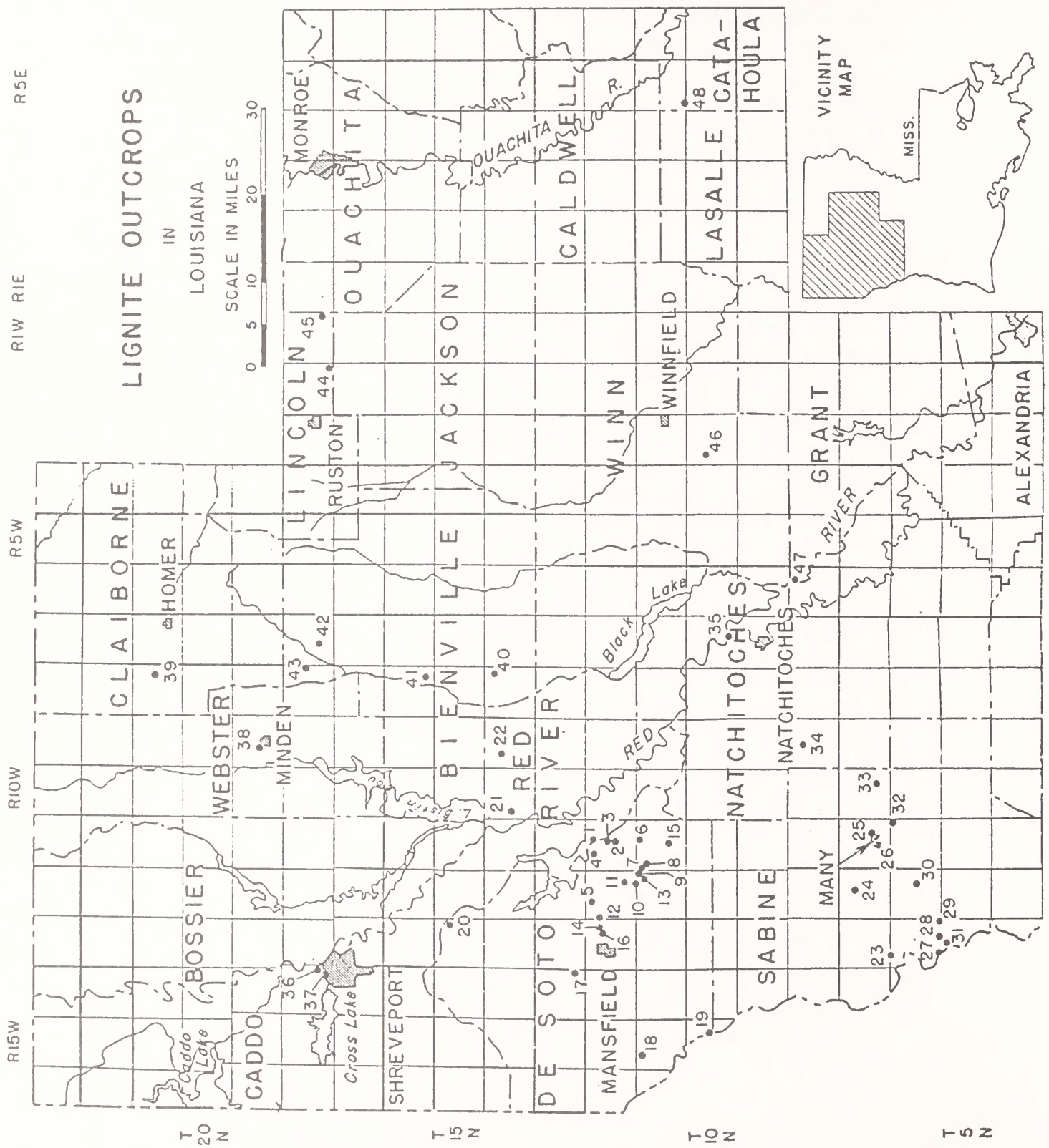
(3) Implications for FMO. It is possible that gypsum and anhydrite may be located on some FMO in Louisiana, particularly in areas where oil and gas operations are taking place on salt dome traps. Profitable development, and thus the likelihood of development of federally-owned gypsum and anhydrite, will depend on the depth of the resources and their location with respect to probable markets.

Lignite

(1) Development and History and Current Situation. Louisiana lignite outcrops occur in lenses in Gulfward-dipping Lower Tertiary (primarily Eocene) strata in 13 northwestern parishes. There are many different lignite beds in Louisiana, ranging in thickness from a few inches to 15 feet; however, most of these beds are discontinuous across long distances. Although lignite's economic possibilities have been discussed since the early 1800's, no substantial development of the resource occurred until very recently. In the early 1900's, several attempts were made to mine lignite, but only small-scale, local efforts experienced any success.

It is estimated that the lignite supply in Red River and DeSoto Parishes alone is 600 million tons, with energy potential equivalent to 9 trillion cubic feet of gas. Some extensive private Louisiana lignite leases have been recently acquired by industry. It is estimated that operations on these leases could produce three to five million tons of lignite per year. Despite its lower heating value relative to bituminous coal, natural gas, and oil, lignite transportation can be made economically feasible if the heat energy it produces can be put to more than one use. Currently, surface-minable lignite reserves in DeSoto and Red River Parishes are being used as fuel in the metal, chemical and petrochemical industries that line the Mississippi River in southeastern Louisiana. Deep-basin lignite in the same general area of northwestern Louisiana are considered promising for future in-situ gasification. In addition, lignite is used as a source of various chemicals, dyes and fertilizer.

Please see Figure 6, lignite outcrop map.



(Meagher and Aycock, 1942)

Figure 6

(2) Future Potential. Despite the limited lignite development that has taken place to date, this mineral is still widely considered an "alternate" energy source; however, eventual depletion of Louisiana's gas and oil will focus more and more attention on lignite as a valuable source of fuel. At present, lignite can only be considered a commercially valuable material under specific circumstances that enable its development and utilization to be economically feasible. The high cost of transportation of reserves from their location in northwestern Louisiana to likely markets in the southeastern part of the State will continue to be a problem for the foreseeable future.

(3) Implications for FMO. Although it is likely that some lignite exists on Louisiana FMO, it is improbable that industry will demonstrate much interest in leasing it at present. The situation will have to be re-evaluated periodically as Louisiana reserves of gas and oil become depleted.

c. Louisiana Mineral Resources Not Currently Being Developed

Peat

Although Louisiana peat is even further from the point of widespread development than is lignite, and has much lower heating value, development of this resource may become economically feasible in the future as reserves of more traditional fuels are depleted. Peat is present in vast quantities in coastal Louisiana.

Geothermal Resources

The U.S. Department of the Interior estimates that the electric power potential from Gulf Coast (Louisiana and Texas) geothermal resources is 115,000 megawatts over a 30-year period. Test sites have been selected, but no development has yet taken place.

d. Summary

Natural gas and oil will continue to be the Louisiana mineral resources that have the greatest potential with respect to development on FMO. Little, if any, industry interest has been expressed for other Federal minerals in Louisiana, although many of these minerals have at least some potential for discovery and development on FMO. It is likely that, for the foreseeable future, development of Federal minerals in Louisiana will continue as it has been, with oil and gas being virtually the only Federal mineral of apparent interest to industry.

2. Paleontological Resources

To assist the BLM in the current planning effort, the State Paleontologist (David Pope) at the Louisiana Geological Survey was contacted and asked to identify any significant paleontological sites in Louisiana. The State Paleontologist provided a bibliography of paleontological studies and identified the only known surface paleontological site still extant (i.e., the Montgomery Landing site along the Red River). Mr. Pope stressed that the surface paleontological sites identified in the bibliography have all been destroyed.

The paleontological resources of Louisiana, for the purposes of this report, should be considered relative to the ability to be altered or disturbed by surface management activities. This has the effect of eliminating from consideration those stratigraphic sections, with any attendant fossils, older than the Cretaceous period. All time periods of Creataceous age or younger are to some degree, fossiliferous. The environments of deposition were, for the most part, shallow marine seas and embayments, deltas and rivers. The fossil record reflects this.

The rock formations at Montgomery Landing are not all fossiliferous. The Cockfield Formation of middle Eocene age represents a delta plain depositional environment and, being non-marine, contains few if any fossils.

The next youngest rocks are represented by the Moodys Branch Formation of upper Eocene age. The sediments that formed these rocks were deposited in a shallow (depths are presumed to be between 30 and 60 feet) water marine environment along a retrograding shoreline. Fossils in this formation include gastropods, bivalves, anthozoans and portions of both cartilaginous and boney fish. For a complete listing see Table 8.

Table 8.
Moodys Branch Ecological Grouping from Montgomery Landing.

a. Sphyraena (Chordata: Vertebrata: Osteichthyes)
b. Odontaspis (Chordata: Vertebrata: Chondrichthyes
c. Myliobatis (Chordata: Veftebrata: Chondrichthyes
d. Calyptraphorus (Mollusca: Gastropoda: Mesogastropoda)
e. Euspira (Mollusca: Gastropoda: Mesogastropoda)
f. Flabellum cuneiforme (Coelenterata: Anthozoa: Scleractinia)
g. Conopeum (Bryozoa: Gymnolaemata: Cheilostomata)
h. Trochocyathus lunulitiformis (Coelenterata: Anthozoa: Scleractinia)
i. Athleta (Mollusca: Gastropoda: Neogastropoda)
j. Hilgardia multilineata (Mollusca: Bivalvia)
k. Nucula spheniopsis (Mollusca: Bivalvia: Taxodonta)
l. Corbula densata (Mollusca: Bivalvia: Desmodonta)
m. Alveinus.minutus (Mollusca: Bivalvia: Heterodonta)
n. Venericardia diversidentata (Mollusca: Bivalvia: Heterodonta)
o. Lucina curta (Mollusca: Vivalvia: Heterodonta)
p. Glycymeris filosa (Mollusca: Bivalvia: Taxodonta)

The Yazoo Clay Formation is next in the sequence and is also of upper Eocene age. These rocks were formed in an open shelf environment, in deeper water (depths are judged to have been between 60 and 100 feet) and further from shore than the rocks of the Moodys Creek Formation. The Yazoo Clay fossil record is represented by gastropods, bivalves, scaphopods, crustaceans, gymnolaematans, cartilaginous and boney fish and even a mammal skull. For a complete listing see Table 9.

Table 9.
Yazoo Ecological Grouping From Montgomery Landing

a. Galeocerdo clarkensis (Chordata: Vertebrata: Chondrichthyes)
b. Trichiurus (Chordata: Vertebrata: Osteichthyes)
c. Turritella arenicola (Mollusca: Gastropoda: Mesogastropoda)
d. Ostrea (Mollusca: Bivalvia: Dysodonta)
e. Endopachys.maclurii (Coelenterata: Anthozoa: Scleractinia)
f. Euspira jacksonensis (Mollusca: Gastropoda: Mesogastropoda)
g. Basilosaurus cetoides (Chordata: Vertebrata: Mammalia)
h. Euscalpellum latunculus (Arthropoda: Crustacea: Cirripedia)
i. Bregmaceros troelli (Chordata: Vertebrata: Osteichthyes)
j. Lichenopora (Bryozoa: Gymnolaemata: Cyclostomata)
k. Alveinus minutus (Mollusca: Bivalvia: Heterodonta
l. Cadulus margarita (Mollusca: Scaphopoda)
m. Pinna (Mollusca: Bivalvia. Dysodonta)
n. Nucula spheniopsis (Mollusca: Bivalvia: Taxodonta)

There are no currently known paleontological sites located on or in proximity to any BLM-administered surface tracts. Fossils of significant scientific interest that may occasionally occur on public domain will be evaluated for protection within the context of a given project. In the unlikely event that significant paleontological sites are discovered on public domain that require immediate protection, ACEC's may be designated on an interim basis. (The term interim is used since BLM will eventually transfer or dispose of all remaining public domain parcels in Louisiana.) Attempts will be made to transfer any significant paleontological sites to a public or non-profit entity with appropriate management capabilities.

3. Wildlife Including Threatened/Endangered Species

The Federal Land Policy and Management Act of 1976, Endangered Species Act of 1973 and amended 1982, Marine Mammal Protection Act of 1972, and the Fish and Wildlife Act of 1956 requires the Bureau to identify and evaluate wildlife and wildlife habitat. The Bureau uses its planning system to make these determinations for any wildlife resource of significant scientific value or interest. This is especially true of any species which is protected by the Endangered Species Act. When these resources are identified in the proposed planning process, possible habitat management plans have to be developed to protect them. Agreements with State or other Federal agencies may also be developed in order to protect a species to its fullest. Most protection measures will ordinarily be accomplished through mitigation measures developed through the Bureau planning system. If the species or habitat is under the protection of the Endangered Species Act, then restrictions may have to be developed in cooperation with other State and/or Federal agencies through the Section 7 process of the Endangered Species Act.

The primary key to Louisiana's abundant wildlife population is the diverse assortment of habitat types. The State has, in abundance, the major components needed for excellent wildlife habitat to exist. These components consists of food, water, cover, breeding territory, and good wildlife management practices. It is also important to consider that a number of natural and man-made damaging influences are steadily depleting the State's habitat areas which means that the habitat management practices now being performed by the State Wildlife and Fisheries agencies must continue at the same level.

One of the most important and successful programs of the Louisiana Department of Wildlife and Fisheries is the establishment and development of the 38 wildlife management areas throughout the State (See Figure 7). These 38 wildlife management areas consists of approximately 1,080,915 acres of which 573,437 acres belong to the State while the rest of the acreage is leased. The Bureau has no known lands or minerals within these management areas. All these management areas are open to hunting and fishing and other outdoor recreation. They represent every habitat type found in the State such as marsh lands, bottomland hardwoods, cypress-tupelo swamps, mixed pine hardwoods, cut over pine lands, pure pine lands, and backwater areas. These habitat types represent some of the best habitat areas within the State, including habitat used by endangered species.

There are also 4 State Wildlife Refuges and 10 National Wildlife Refuges in the State of Louisiana (See Figure 7). Louisiana has a unique management system for wildlife management. The Division of Wildlife manages certain areas and refuges while the Division of Refuges manages other areas and refuges. These lands represent some of the most prime wildlife habitat areas in the State.

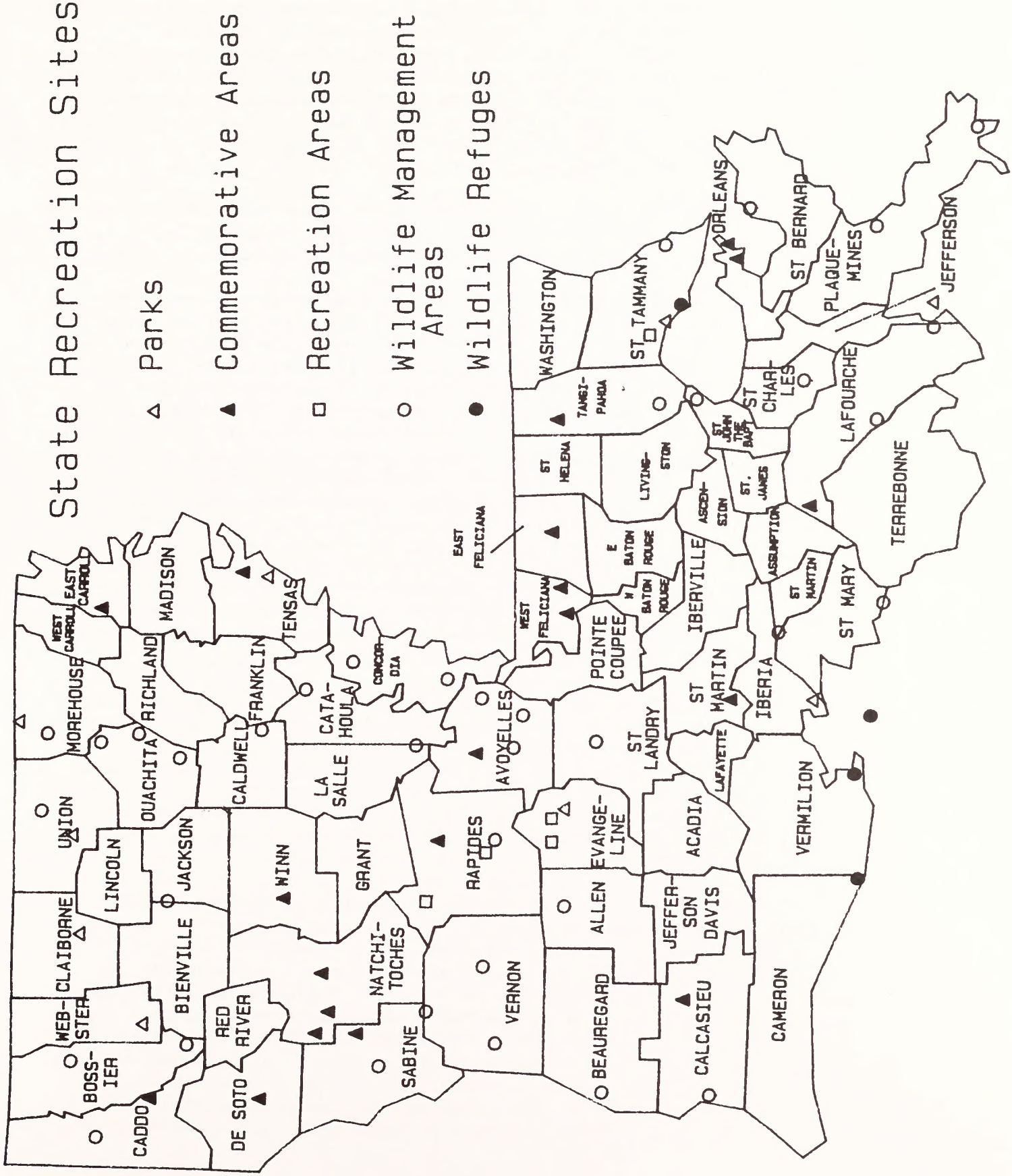

State Recreation Sites
Parks
Commemorative Areas
Recreation Areas
Wildlife Management Areas
Wildlife Refuges
CADDO
BOSSIER
WEBSTER
CLAIBORNE
UNION
LINCOLN
JACKSON
BIENVILLE
RED RIVER
DE SOTO
NATCHITOCHES
SABINE
WINN
GRANT
LA SALLE
CALDWELL
FRANKLIN
CATAHOULA
CONCORDIA
TENSAS
RICHLAND
OUACHITA
MOREHOUSE
WEST CARROLL
EAST CARROLL
MADISON
RAPIDES
AVOYELLES
VERNON
BEAUREGARD
ALLEN
EVANGELINE
ACADIA
JEFFERSON DAVIS
CALCASIEU
CAMERON
VERMILION
LAFAYETTE
ST MARTIN
IBERIA
ST LANDRY
POINTE COUPEE
WEST FELICIANA
EAST FELICIANA
IBERVILLE
E BATON ROUGE
W BATON ROUGE
ST HELENA
LIVINGSTON
ASCENSION
ST JOHN THE BAPTIST
ST JAMES
ST CHARLES
ASSUMPTION
LAFOURCHE
TERREBONNE
ST MARY
WASHINGTON
TANGIPAHOA
ST TAMMANY
ORLEANS
ST BERNARD
PLAQUEMINES
JEFFERSON

Figure 7

The major wildlife habitat types of the State include bottomland hardwood (approximately 5,497,000 acres), coastal marshland (approximately 4,500,000 acres), Cypress-Tupelo swamp (approximately 600,000 acres), mixed pine hardwood (approximately 2,207,000 acres), pine (approximately 5,095,000 acres), upland hardwood (approximately 1,725,000 acres), and farmland (approximately 7,600,000 acres). All these figures are approximate due to the changing nature of economic development and population growth in the State.

The following is a description of the major habitat areas of the State. These descriptions include vegetative, wildlife, and coastal area information needed for the existing environment of Louisiana:

Bottomland Hardwoods: Bottomland hardwood forest types are found in the floodplains of most of Louisiana's river systems. The rich alluvial soils associated with these forests provide the foundation for some of the most productive forest land in the Nation. Species composition of seasonally flooded bottomland hardwoods includes a variety of oaks, elms, ashes, gums, and hickories. Bottomland stands which are inundated for long periods of time are usually composed of cypress and water tupelo (see discussion under marshlands and cypress-tupelo swamps). Bottomland hardwoods produce abundent mast crops which support a wide varity of wildlife (deer, squirrels, turkey, swamp rabbits, woodcock, bobcat, fox, racoon, mink, etc.) These areas also provide crucial habitat for resident and migratory waterfowl. Seasonal flooding covers the mast crops, making them available to waterfowl that feed in shallow water. Many acres of these important bottomland forests have been lost to timber harvesting and clearing for agricultural purposes.

Mixed Pine Hardwood: Species found within this type are deer, turkey, squirrels, rabbits, fox, bobcat, and raccoon. While not normally as productive as pure bottomland hardwoods, this type also has a bountiful supply of wild species. Creek bottoms in this ecotype support high populations of squirrels and are most important in furnishing peripheral species (such as deer and turkeys) with food, protection from inclement weather, resting and escape cover.

Pine: Pure pine stands with tight canopies are not normally very productive for wildlife species when compared to the types previously discussed. However, in the longleaf pine belt of the State, southeast and southwest Louisiana, bobwhite quail are found in fair densities. All of the virgin stands of longleaf have been cut over and second growth regeneration in this type now support turkey, deer, and rabbits, as well as quail.

Farmland: Row crops, pasture, and rice culture are also important to the State's wildlife population. Two species not previously mentioned which are directly associated with farmland are doves and cottontail rabbits. While modern clean farming (i.e. removing hedgerows and wooded areas between fields) practices may have reduced farm game populations, mechanical harvesting methods allow large quantities of wasted grain (beans, rice, corn, wheat) to remain on the ground for wildlife use. In the rice growing region of the southwest parishes, doves and ducks are attracted to the area to feed on the wasted rice. In the delta regions of the State, along the Mississippi River, large soybean operations attract waterfowl as these areas flood from winter rains or rising river water. Birds not only eat the wasted soybeans, but there are numerous seeds of grasses and weeds that are products of this area which waterfowl prefer. Combined wheat and corn fields are also attractive to migratory doves. Wet pastures attract snipe and in southwestern Louisiana geese invade winter rye and wheat fields which may result in depredation problems for farmers.

Marshlands and Cypress-Tupelo swamps: Freshwater marshland and cypress-water tupelo swamps are very important wintering areas for waterfowl, and provide key habitat for freshwater fisheries, fur bearing mammals, and American alligators. Freshwater and intermediate brackish marshlands are more productive than saltwater marshes, especially for fur bearers and alligators. Significant losses of freshwater marshland have occured in past years due to saltwater intrusion and interruption of freshwater inputs. As wetlands become more saline, fewer species are able to tolerate the change. The only species that tolerate very saline conditions are marsh raccoons and isolated populations of muskrat. The most productive segment of the coastal marsh is the intermediate/brackish marsh which is subjected to freshwater input and a mixing of brackish water from the Gulf. Historically high populations of muskrats and nutria have occurred throughout the intermediate marsh, such as the fringe of Vermilion Bay, the marshes adjacent to Barataria Bay, and the interior marshes of St. Bernard Parish. In addition to these very productive marshes, the prairie marshes of southwest Louisiana, the active Delta marshes of the Atchafalaya, Mississippi, and Pearl Rivers produce high numbers of furbearers. The intermediate/brackish marshes support plant communities which are heavily utilized by furbearers and waterfowl. The Chenier Plain of southwestern Louisiana, for example, consists of estuarine and palustrine emergent wetlands and is a major North American waterfowl wintering area (see Figure 8). Some of the most important palatable plant species produced in this zone are the olneyi three/square, millet, spike rush and a wide variety of aquatic plants important to the furbearers as well as the waterfowl. Within the brackish marsh zone, a fair population of white-tailed deer also occur.

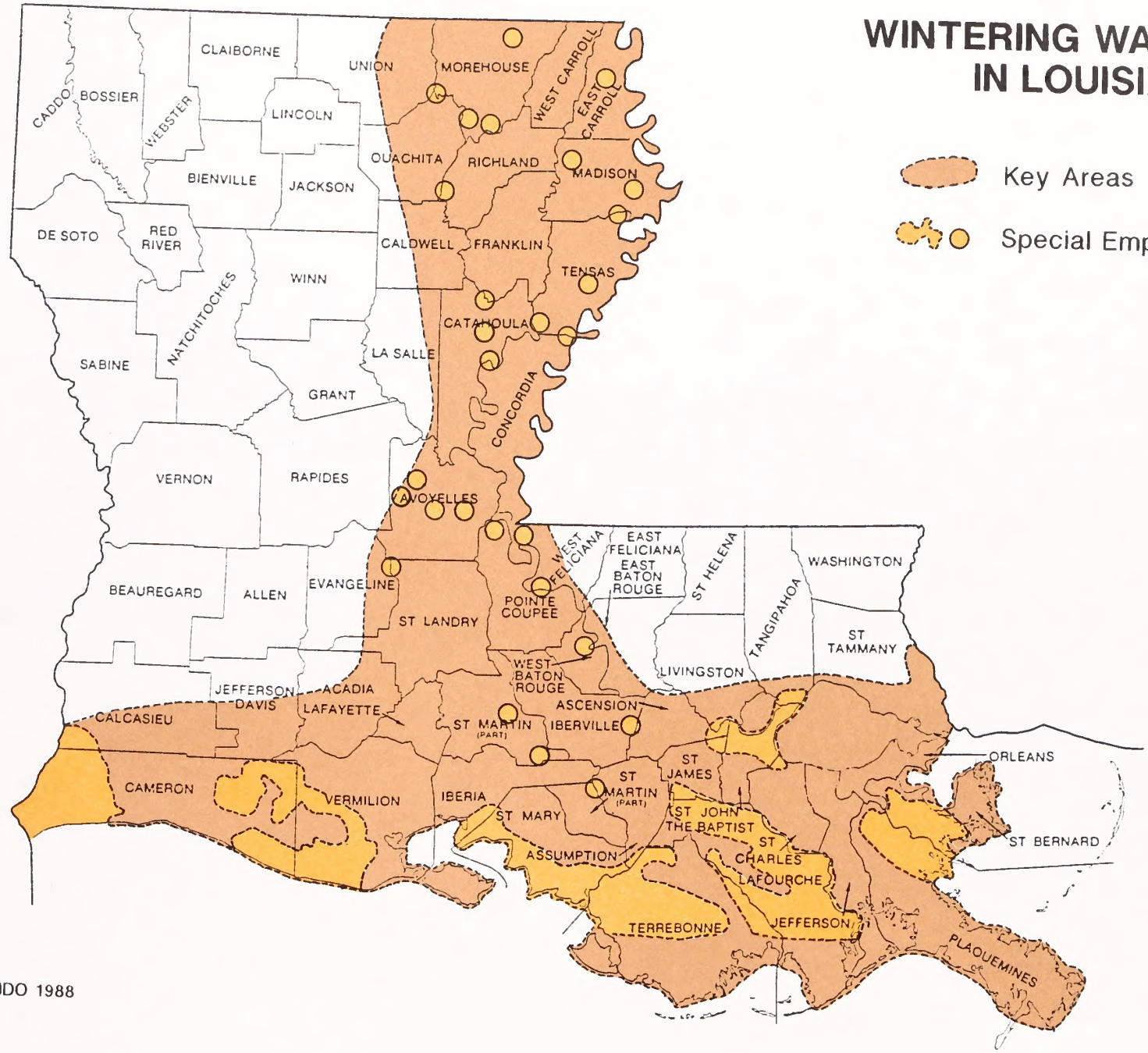


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Figure 8

Figure 8

The saltwater marshes of Louisiana are relatively poor producers of furbearers and alligators with only limited occurrences of other wildlife species. Many intermediate marshes have been changed along the Louisiana coast as a result of saltwater intrusion through navigational projects, and some excellent fur producing marshes have been eliminated by this.

Agricultural invasion in the form of sugar cane, rice fields, cow pastures, and in recent years industrial development adjacent to the coastal marshes brought about by the petro-chemical industries have converted many marshlands and changed the edaphic conditions. The fresh marshes are very important from the waterfowl, fur-bearer, and white-tailed deer standpoint; and many of the natural ridges which penetrate into the marsh interior provide habitat for squirrels and rabbits.

There are three groups of wildlife within the State which are important commercially to the economy of the State. Their value lies within the number of people employed and the amount of money spent and taken in from these wildlife resources. These wildlife resources are the hunting (migratory waterfowl) industry, the fur/trapping industry, and the fishing industry.

The State of Louisiana leads the nation in the migration of waterfowl through its coastal areas. The State has habitat areas with abundant food, nutrients, fresh water, and extensive management practices by both State and Federal Wildlife agencies. This has led migratory flocks of waterfowl, as well as other bird species, to make Louisiana not only their winter home, but for some their year around home (see Table 10).

Table 10
Wildlife Species Important to the Economy of Louisiana

Fur/trapping industry:	Fishing	
	Fresh Water	Salt Water
Alligator	Catfish	Oyster
Muskrat	Buffalo	Shrimp
Nutria	Drum	Crabs
Raccoon	Shad	Trout
Opossum	Gar	Flounder
Red fox	Carp	
Gray fox	Paddlefish	
Bodcat	Bowfin	
Mink	Crawfish	
Otter		
Skunk		
Beaver		
Coyote		

Migratory Birds

Ducks and coots (different species)
Geese (different species)

The fur industry of Louisiana ranks first in the nation in both income and the amount of fur taken. There are many different fur bearing species within the State with the largest number being found in the coastal zone (see Table 10). This zone has many water ways, good clean water, vegetative cover, and an abundance of food stuffs which allows heavy trapping to occur while posing little risk to desired species population levels. The fur industry, with management by the Fur and Refuge Division, has greatly increased the quality and quantity of the these fur bearing species.

The alligator is also included in this class because of the value of its skin or hide. The alligator is wide spread in Louisiana and is harvested in certain areas of the State. The animal is threatened under the "similarity of appearance" clause which means it is similar or identical to an animal (other crocadilians) which is endangered. In most of the coastal parishes there is a controlled harvest of the animal. There is however, no protection afforded to the habitat of the American alligator under the Endangered Species Act.

The fisheries portion of the State Wildlife program is, like the fur and migratory birds programs, one of the State's most important programs. This is due not only to the abundance and quality of the resource but also the economic value of the resource to the State and its people. Disregarding cold water fisheries, Louisiana has the most diversified habitat in the nation. The varied habitat types include salty gulf water; coastal estuarine areas that contain salt, brackish and fresh waters; and the various freshwater lakes, farm ponds, rivers, and streams widely scattered throughout the State. Each of these habitat types has characteristics and components that are unique to that particular ecosystem. These habitats are characterized by varying productivity and production potentials. Fisheries habitat must be viewed as being the primary consideration in the management and perpetuation of the rich fisheries resources. Of all the wildlife resources found in the State this is the one that would require less mitigation than any of the others except for certain critical areas where sensitive species may occur. The States numerous bodies of water have created fish habitat areas in such quantity and quality that to try and manage either the species or the habitat would be extremely difficult and expensive. This has led to a policy of maintenance of the program more than actual management of the program.

There are no listed threatened or endangered species of fish in the State at this time, therefore this issue is not addressed.

In situations of split estate lands where there are Federal minerals and private surface lands involved the Bureau must still address the wildlife and endangered species issue. BLM manages the habitat of the species (where BLM activities affect habitat) and the State manages the species itself. The U.S. Fish and Wildlife Service manages threatened and endangered species. It is still the responsibility of BLM to insure that at no time the agency authorizes or carries out any action which may be harmful to either the species or its habitat.

There are 24 threatened and endangered (T&E) species which are protected under the Endangered Species Act, 1973, as amended, in the State of Louisiana. A complete list of these species follows. Of the T&E species listed, the red-cockaded woodpecker (Picoides borealis), bald eagle (Haliaeetus leucocephalus), ringed-sawback turtle (Graptemys oculifera), gopher tortoise (Gopherus polyphemus), Louisiana pearlshell mussel (Margaritifera hembili), and the brown pelican (Pelacanus occidentalis) all have viable resident populations in the state. Figure 9 depicts generalized locations for sitings of T&E species throughout the State.

Known significant red-cockaded woodpecker habitat and nesting colonies are spread through fourteen different parishes. The sites in six parishes are primarily located on the Kisatchie National Forest. One site is located on US Army Ammunition Depot land in Webster parish. A cluster of sites in Morehouse Parish and two sites in Allen Parish are near known FMO totaling over 600 acres. See Figure 9 for locations of woodpecker colonies.

Red-cockaded woodpeckers require mature (greater than 60 year old), park-like pine stands for their nesting colonies. The birds most commonly will excavate nesting cavities in living trees that are infected with red-heart fungus. A group of cavity trees is called a nesting colony. These birds are endangered primarily because of a loss of suitable habitat. Most mature pine stands have been harvested for their lumber, and replacement stands are not normally allowed to grow to the age required by the woodpeckers.

The bald eagle has been protected under the Eagle Protection Act (16 U.S.C. 668-668d) of June 8, 1940, as amended October 23, 1972. The bald eagle below the 40th parallel was listed as endangered under the Endangered Species Act. Bald eagle nests in the State have occurred primarily along the Mississippi River Valley, the Gulf Coast, and the Sabine River. In 1986, 29 bald eagle nests were active in the State (see Figure 9 significant nesting areas.) Nests are often in the ecotone of forest and marsh or water, and are concentrated in dominant or codominant living pine or bald cypress 3km (1.86 miles) or less from open water (McEwan and Hirth, 1979).

The area delineated as having prime eagle nesting habitat effects approximately 750 acres of FMO under private surface, five public domain parcels, ten Corps of Engineer projects with FMO, a portion of the Jean Lifitte National Park, and a 50 acre Coast Guard Facility. Protective stipulations would be applied on a case-by-case basis for any license or permit located in the above areas.

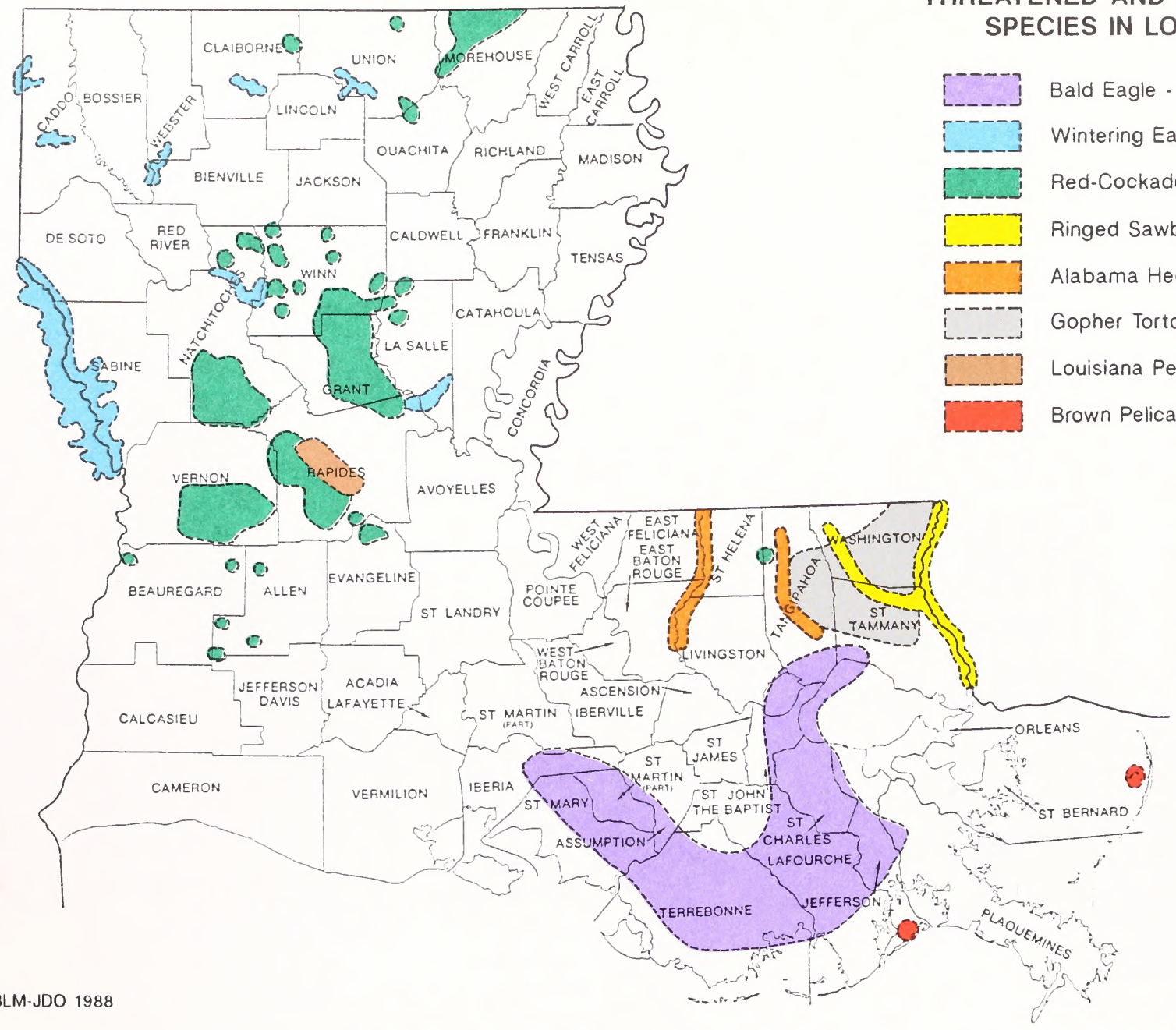

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Figure 9

The ringed-sawback turtle is found in Louisiana in the Pearl and Bogue Chitto river systems. Habitat modification (primarily from flood control and navigation improvments) has occured in 21 percent of the turtle's former range in the Pearl river. Recovery of this species depends upon improvement of water quality in these drainages, and protection of remaining quality habitat.

Brown pelicans, though no longer endangered throughout most of their range, are still endangered in Louisiana. Of the few known nesting sites in the state, one is located on Queen Bess Island, where the minerals are federally owned. There has been mineral interest in the island in the past, evidenced by a terminated lease (BLM 040659). Pelicans are easily disturbed during their nesting and fledgling stages. Human activity within close proximity to the nest site can cause the birds to abandon their nests (pers. comm., Dwight Cooley).

The Louisiana pearlshell mussel (listed as endangered) is known to occur in 11 headwater streams in the Bayou Boeuf drainage, Rapides Parish. The mussel is found primarily on the Kisatchie National Forest, Evangaline Ranger District. Decline of this species has been attributed to flooding by impoundments, sedimentation and other water quality problems. Protection and recovery of this species is dependant upon improving water quality throughout its range.

The gopher tortoise is found in Washington and St. Tammany Parishes. The tortoise is restricted to upland sandy ridges, primarily in longleaf pine stands. The tortoise population in the state consists of scattered individuals, and as such could be considered functionally extinct because of a lack of breeding populations or colonies (pers. comm., Wendal Neal).

Table 11
Federally Protected Threatened or Endangered Species
for the State of Louisiana
(note: E=Endangered, T=Threatened)

Mammals	General Distribution
Panther, Florida (Felis concolor coryi) - E	Entire State
Whale, right (Eubalaena glacialis) - E	Coastal Waters
Whale, finback (Balaenoptera physalus) - E	Coastal Waters
Whale, humpback (Megaptera borealis) - E	Coastal Waters
Whale, sei (Balaenoptera borealis) - E	Coastal Waters
Whale, sperm (Physter catodon) - E	Coastal Waters
Wolf, red (Canis rufus) - E	Cameron and Calcasieu Parishes
Birds	
Curlew, Eskimo (Numenius borealis) - E	Entire State
Eagle, bald (Haliaeetus leucocephalus) - E	Entire State
Falcon, Arctic peregrine (Falco peregrinus tundrius) - T	East, South
Pelican, brown (Pelecanus occidentalis) - E	Coast
Plover, piping (Charadrius melodus) - T	Coast
Tern, least; interior population (Sterna antillarum) - E	Mississippi River and tributaries N. of Baton Rouge
Warbler, Bachman's (Vermivora bachmanii) - E	Entire State
Woodpecker, ivory-billed (Campephilus principalis) - E	Entire State
Woodpecker, red-cockaded (Picoides borealis) - E	Entire State except Delta
Reptiles	
Alligator, American (Alligator mississippiensis) - T(S/A)*	Entire State
* For law enforcement purposes the alligators in Louisiana are classified as "Threatened due to Similiarity of Appearance". They are biologically neither endangered nor threatened. Regulated harvest is permitted under State law.	
Tortoise, gopher (Gopherus polyphemus) - T	Southeastern
Turtle, Kemp's (Atlantic) ridley (Lepidochelys kempii) - E	Coastal Waters
Turtle, green (Chelonia mydas) - T	Coastal Waters
Turtle, hawksbill (Eretmochelys imbricata) - E	Coastal Waters
Turtle, leatherback (Dermochelys coriacea) - E	Coastal Waters
Turtle, loggerhead (Caretta caretta) - T	Coastal Waters
Turtle, ringed sawback (Graptemys oculifera) - T	Pearl and Bogue Chitto Rivers
Mollusks	
Mussel, Louisiana pearlshell (Margeritifera hembili) - E	Rapides Parish

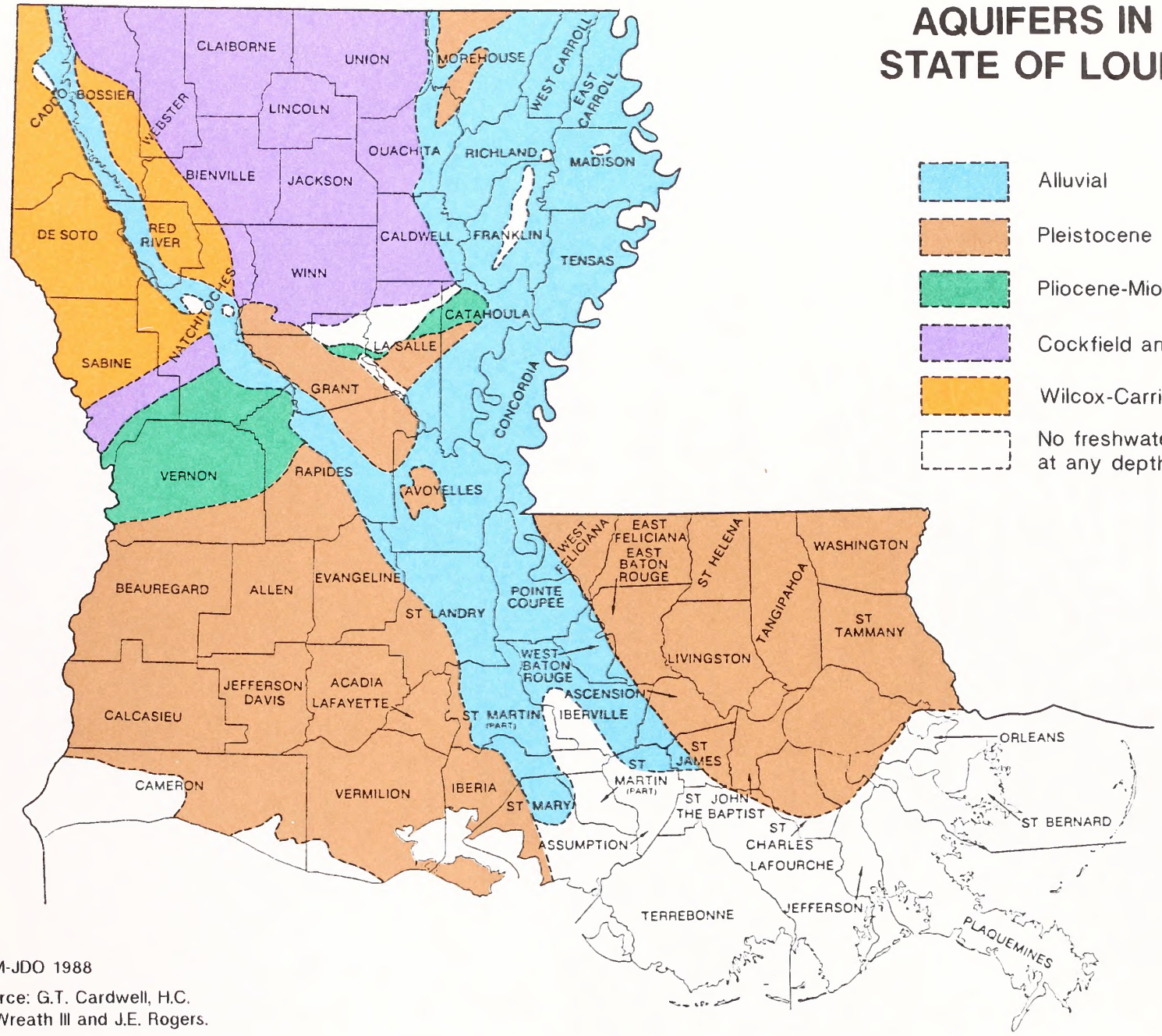
4. Water Resources

a. Ground Water

About 85 percent of public supply systems and over half of the State's population depend on ground water, a resource which is increasingly held to be a public rather than a private resource. Most of the State, with the exception of some parishes in southeastern Louisana, is underlain by large, productive freshwater aquifers (Figure 10), especially in Quaternary deposits where wells may produce 6,000 gallons per minute (gpm). Local groundwater supply problems, however, have occurred due primarily to heavy pumpage from several of the major aquifers in the State, resulting in subsidence, streamflow changes, and in some cases, declines in water quality. Declines in water levels range from 180 feet in wells tapping the Chicot aquifer to 430 feet in wells completed in the "2,000-foot" sand at Baton Rouge (USGS, 1984). In several parts of north Louisiana, groundwater supplies are insufficient because the aquifers are not of consistent permeability and thickness as they are in other areas. Water levels in individual aquifers have stabilized because of changes in water management in recent years, but local and regional declines continue in several major aquifers.

Groundwater recharge is supplied by rainfall on outcrop areas, by seepage from streams, and by interaquifer leakage. Annual recharge rates range from about 1 to 12 inches. Discharge of water from shallow aquifers sustains the low flow of streams in Louisiana.

The principal aquifers of Louisiana are categorized into five major aquifer groups: Alluvial, Pleistocene, Pliocene-Miocene, Cockfield and Sparta, and Wilcox-Carrizo. These aquifers are described in summary in the Table 12 below and their locations are shown in Figure 10. The Chicot and Sparta aquifer outcrop areas are particularly important recharge zones in the State, although these areas currently receive no special recognition or protection.



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Source: G.T. Cardwell, H.C. McWreath III and J.E. Rogers.

Figure 10

Table 12.
Aquifer and well characteristics in Louisiana
(Summarized from National Water Summary, 1984, USGS).

Aquifer Name	Water Withdrawals in 1980 (Mgal/d)	Well Characteristics				Principal Issues
		Depth (ft)	Yield (gal/min)			
		Range	Maximum	Range	Maximum	
Alluvial aquifers	271	100-250	400	500-2,500	7,000	Mississippi, Red, and Ouachita River valleys. High concentrations of iron; slightly saline water locally in the Red and Mississippi River valleys possibly from oil-field brines.
Pleistocene aquifers: Terrace aquifers:	-	50-150	200	40-400	1,000	Northern and central Louisiana. Limited production capacity of terrace aquifers in some areas.
Chicot aquifer	995	50-800	1,000	500-2,500	4,000	Southwestern Louisiana. Saltwater problems, including encroachment in local coastal areas.
The "400-foot" and "600-foot: sands (at Baton Rouge) and upper Ponchatoula and Gonzales-New Orleans aquifers	126	100-800	1,000	500-1,000	2,500	Southeastern Louisiana. Saltwater encroachment in the "600-foot" sand at Baton Rouge and in the Gonzales-New Orleans aquifer. Potential contamination from waste disposal in some areas.

Figure 10

Source: G.T. Cardwell, H.C. McWreath III and J.E. Rogers.

Aquifer Name	Water Withdrawals in 1980 (Mgal/d)	Well Characteristics				Principal Issues
		Depth (ft)		Yield (gal/min)		
		Range	Maximum	Range	Maximum	
Pliocene-Miocenee aquifers: Jasper	299	200-2,200	2,800	200-1,200	3,000	Southwestern, western, and central Louisiana. Locally elevated flouride concentrations dark color, depletion of artesian water in intensively pumped areas, and local saltwater encroachment in the Baton Rouge area.
The "1,200-foot" and deeper sands in Baton Rouge area and lower Ponchatoula and deeper aquifers in southeastern Louisiana (not shown in Figure 1):	-	800-2,800	3,300	500-1,500	4,000	Southeastern Louisiana. May have large iron concentrations locally.
Cockfield and Sparta aquifers:	76	200-900	2,000	50-1,800	2,500	In western part of State. Water in the Cockfield typically has color greater than 30 units; Sparta has declining water levels (1-3 feet per year) and some saltwater encroachment.
Wilcox-Carrizo aquifer:	10	100-600	800	40-150	350	Equivalent to Carrizo-Wilcox aquifer in Texas. Aquifer sands are generally thin and fine, which restricts well yields.

b. Surface Water

A major resource in Louisiana is the abundance of water. The average flow of the Mississippi River, the largest river system in North America, contains 25 times the total withdrawal requirements of the State, approximately 583,000 cubic feet per second (USGS, water year 1974). The Mississippi is one of 29 navigable rivers in the State, which include the Red, Pearl, Sabine, Atchafalaya, Ouachita, and several shorter rivers. Approximately six percent of the State is covered by surface water (3,100 square miles) derived from rainfall runoff, groundwater, and inflows to the State. Mean annual rainfall ranges from 54.5 inches in northwest Louisiana to 65 inches in the southeastern portion. Average annual runoff ranges from ten inches in the southeast to 20 inches in extreme southeastern Louisiana. Consumptive use of public-supplied freshwater ranks forth in the nation at 350 million gallons per day (Solley, 1980). Irrigation use totals 2.2 billion gallons per day, much of which is used for rice crops in southwestern Louisiana.

Reports prepared by the Louisiana Department of Transportation and Development (Office of Public Works (1984) and the U.S. Geological Survey in consultation with State officials identified major water issues on water-availability, water quality, and hydrologic hazards in the State, generally associated with deficient low flows, saline-water intrusion, flooding, erosion, sedimentation, and major point/non-point sources of water pollution. These are depicted in generalized form on Figure 11.

5. Floodplains, Wetlands and Coastal Zones

a. Floodplains

With an annual precipitation exceeding 60 inches in some areas and a vast expanse of floodplains, Louisiana is subject to frequent floods along all major streams and many tributaries. River flow can be nearly independent of local rainfall because of the drainage size of the Mississippi River System, approximately 1.23 million square miles. Flood damage has been extensive in urban areas, including New Orleans, Baton Rouge, Slidell, Monroe, and Alexandria, with a total flood damage exceeding $400 million in 1982.

The Mississippi River has always been a threat to Louisiana's surrounding lands and resources. It is the fourth largest drainage basin in the world and drains 41 percent of the 48 coterminous States of the United States. If not for the rivers flood control systems, 35,000 square miles of lands bordering the river would be flooded periodically.

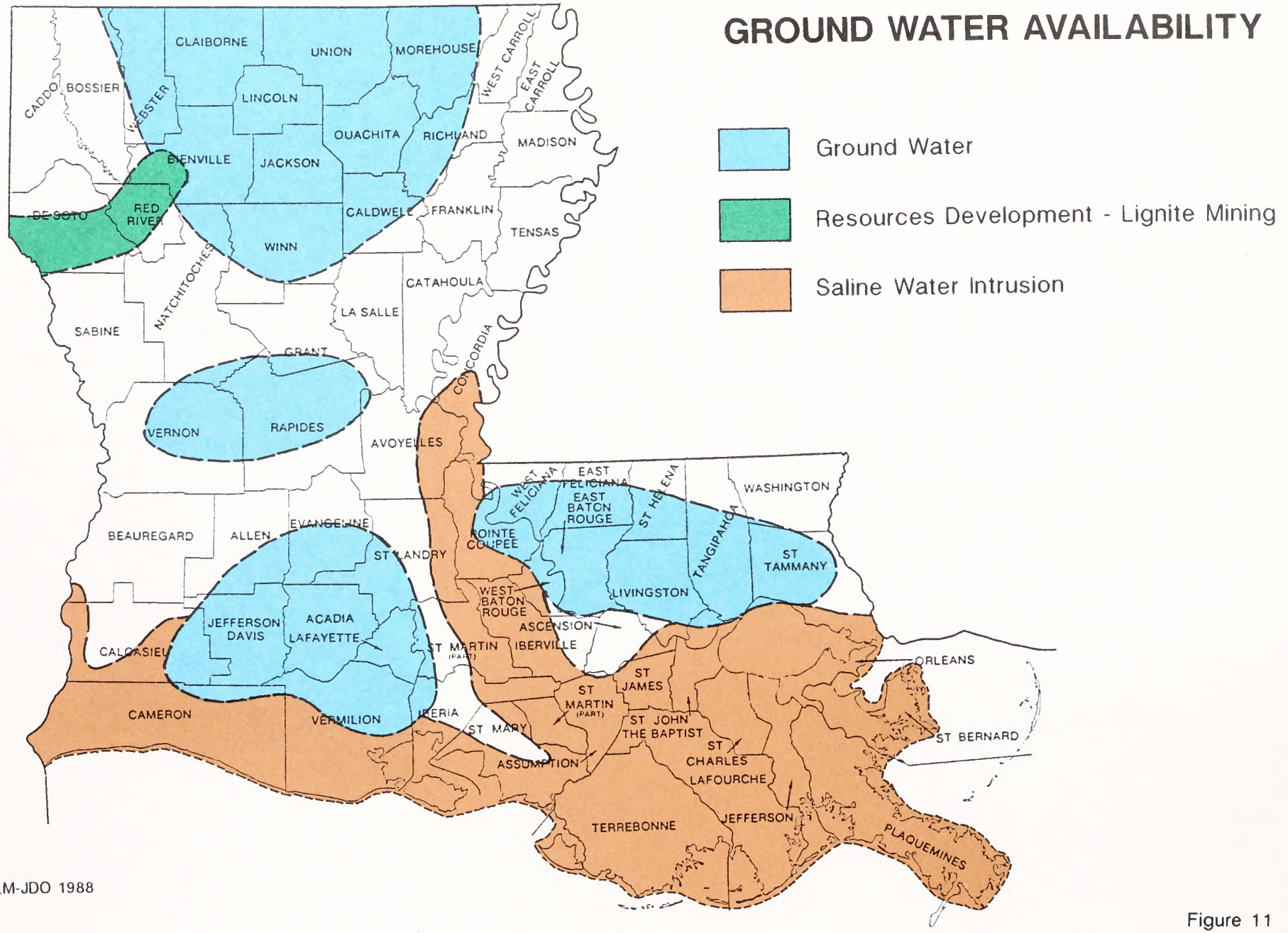

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Figure 11

Louisiana has an elaborate flood control system which was developed by the Corps of Engineers. The Mississippi Rivers' floodflow is diverted and controlled through this complex system. It is therefore not likely that Bureau of Land Management public lands will experience extensive flooding from the Mississippi River because of man's continuous intervention.

b. Riparian and Wetland Resources

Louisiana contains at least eight (8) major rivers: Mississippi, Tensas, Pearl, Atchafalaya, Calcasieu, Sabine, Red, and Ouachita. In addition, there are numerous wetland and riparian resources throughout the State. The Mississippi Delta Plain contains the largest continuous wetland system in the United States with 1.8 million acres of marshes, not including the forested wetlands at the inland extremes of the basins. The Delta supports the nation's largest fishery resource, produces more furs than any other area of the United States, and is an important wintering ground for migrating water fowl (Gosselink, 1984).

c. Coastal Zones

Louisiana's 5.3-million-acre coastal wetland area stretches across the State from the Pearl River to the Sabine River and contains one third of Louisiana's population (see Figure 12). Louisiana citizens benefit greatly from the resources found within this zone. Benefits begin with the natural cycles of the wetlands, which renew wildlife habitats, nourish the food chain that supports fisheries and fur industries, build new wetlands and barrier islands to protect the coast from storms, and provide lakes, bays, and bayous for sportfishing, boating, and waterborne transportation. The coastal zone itself is an intricate interweaving of ecological systems whose renewable resources include numerous species of wildlife and support fisheries and fur industries that lead the nation. Non-renewable resources, such as crude oil, natural gas, sulphur, and salt, are abundant in this area. Louisiana's coastal zone is clearly an irreplaceable natural resources. Each year approximately 50 square miles of coastal wetlands are lost to either nature or man-made disturbances. This critical problem has led the State of Louisiana to adopt and pass a Coastal Management law to protect this very fragile resource.

COASTAL ZONE BOUNDARY
as defined by Act 361

State of Louisiana, 1978

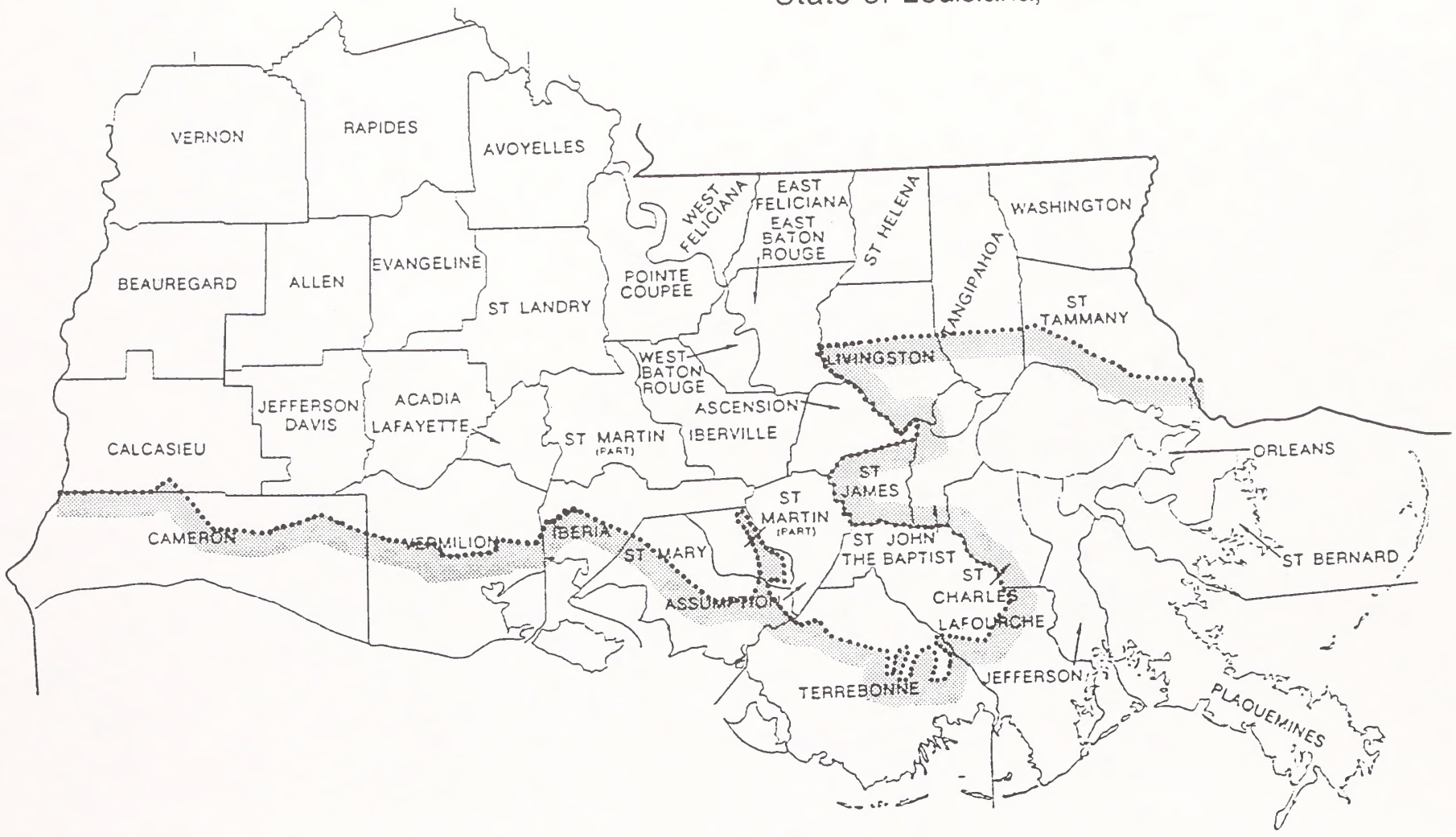


Figure 12

The Coastal Zone Management Act of 1972 along with the State statue entitled, "The Louisiana State and Local Coastal Resources Management Act of 1978 (Act 361)" requires the Bureau to identify and evaluate any resource or Bureau initiated action located within the designated Coastal Management Zone (CMZ) of the State of Louisiana. The law seeks to protect, develop and, where feasible, restore or enhance the resources of the State's coastal zone. Its broad intent is to encourage multiple uses of resources and adequate economic growth while minimizing adverse effects of one resource use upon another without imposing undue restrictions on any user. The Coastal Management Division (CMD) of the Louisiana Department of Natural Resources is charged with implementing the Louisiana Coastal Resources Program (LCRP) under Act 361 to regulate development activities and manage the resources of the coastal zone.

A Coastal Use Permit (CUP) Program has been established by Act 361 to help ensure the management and reasonable use of the State's coastal wetlands. The Coastal Management Division of the Louisiana Department of Natural Resources administers the CUP program which requires resource users who are planning certain projects within the coastal zone to apply for permission to proceed with the proposed project. This permission consists of the granting of a permit by the Coastal Management Division of the State of Louisiana. Some activities which require permits are dredging canals and/or channels; building roads, building storage areas, plant facilities, waste-water facilities, and other surface disturbing activities. Other permits for certain types of actions within these management zones may also be required by other State and Federal agencies.

The BLM would have to go through this application process if a Bureau project were proposed on public lands. In situations of split estate where there are Federal minerals/private surface, the lessee is responsible according to present policy and law for the application and any attached mitigating measures.

6. Wild and Scenic Rivers

There is presently one river in Louisiana which is included in the Federal Wild and Scenic Rivers system. Saline Bayou, located in northcentral Louisiana, has been designated a Scenic River, and is thus afforded the protection outlined in the Wild and Scenic Rivers Act (Public Law 90-542, as amended). The portion of Saline Bayou which has been designated a Scenic River flows through the Kisatchie National Forest, Winn Ranger District, from the northern Forest boundary (also the boundary of Winn/Bienville/Natchitoches Parishes) to the north end of Saline Lake. The Kisatchie NF is currently in the process of drafting a management plan for the Saline Bayou Scenic River. The management plan will delineate the exact boundaries (specifically the width of the protected area) and management guidelines.

The State of Louisiana protects 50 rivers or river segments under the Louisiana Natural and Scenic Streams system. The State's Natural and Scenic Streams are protected by State law, Title 56, Chapter 8, R.S.56:1841 through R.S. 56:1849. This law was created to:

> "...preserve, protect and develop the quality and aesthetics of a natural or scenic stream; to preserve scenic, recreational, fish, wildlife, geological, historical, archeological, botanical, and cultural values of both present and potential benefits; to reclaim natural streams that have been polluted; to complement the present policy of channelization, clearing, snagging, channel realignment, indiscriminate reservoir construction with a program preserving and protecting the quality of natural streams and bayous; to encourage land owner participation in this program; and to provide that the system shall be administered solely by the State of Louisiana" (LA Dep't Wildlife and Fisheries).

The Louisiana Natural and Scenic Streams system is one of the most extensive stream preservation programs of its kind in the nation. The system is composed of some 1300 (more or less) miles of warm water streams which are protected. Louisiana's Natural and Scenic streams support a diversity of aquatic life and riparian dependent species. The streams also provide opportunities for consumptive and nonconsumptive uses including water-oriented recreation, environmental education, and scientific study.

7. Air Quality

The overall air quality for the State of Louisiana is generally good. There are some recorded ozone nonattainment areas within the State (see Figure 13). These areas are above the standards set by the Environmental Protection Agency (EPA) of .12ppm impurities in the atmosphere. These areas are broken down by parishes and by urban and rural areas. Much of the air quality problems in rural areas originate from problem urban area air flow patterns and inversion factors. The State does have many chemical and wood related manufactoring plants which are located in rural areas. Local, State, and Federal agencies responsible for maintaining the air quality of the State closely monitor these areas for possible health problems.

8. Soils

a. General

Soils in Louisiana occur generally in two main physiographic regions in the State. The tertiary uplands in the northwestern section of the State and the quanternary lowlands over the remainder of the State. Acreages of wet (hydric) soils as mapped by the SCS, are considerably greater in Louisiana than in most other States, and are generally located in the floodplains and wetlands of quanternary lowlands.

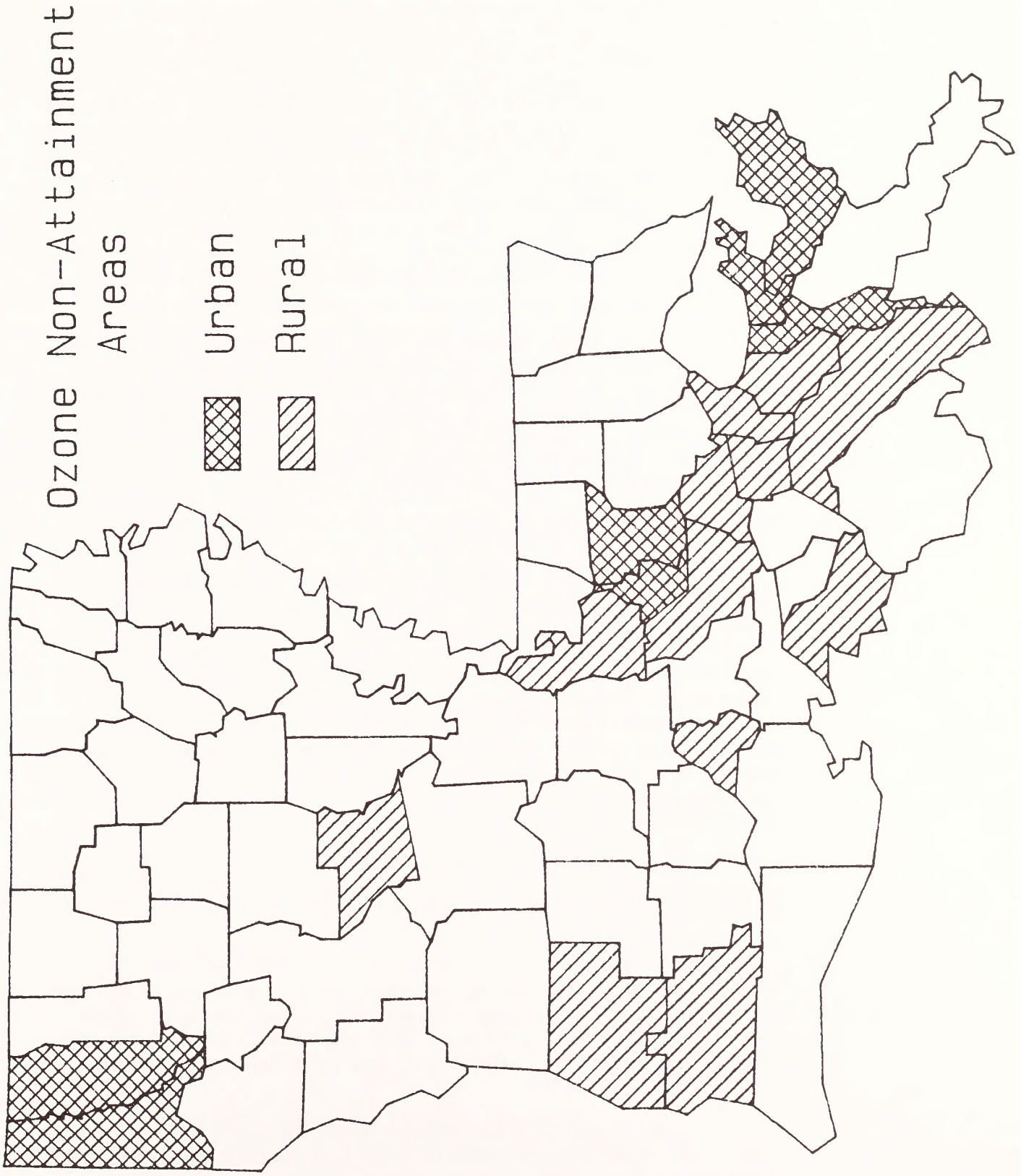


Figure 13

These soils are basically defined as soils that are sufficiently wet under undrained conditions to support the growth and regeneration of hydrophytic vegetation. The soils, when artificially drained, produce a significant amount of food, feed and fiber. Value of wet soils is especially high in Louisiana, where the proportion of wet soils used for cropland is high - about 75 percent of cropland is located on wet soils in the Delta states, which includes Louisiana. Crops grown on these wet soils contribute substantially to the export market, helping to offset the U. S. trade deficit, (Dideriksen and others, 1978). Hydric soils are particularly important with respect to BLM activities in the State, such as oil and gas leasing, possible future lignite extraction, and land disposal actions.

Finally, hydric soils have not been directly correlated at this time with wetlands (Cowardin, 1977), but the Soil Conservation Service (SCS) and U. S. Fish and Wildlife Service are working to clarify the definition of wetlands as related to hydric soils. Once this correlation is established, wetland preservation through protective stipulations in mineral leasing and land disposal activities can be achieved.

b. Prime and Unique Farmlands

Prime farmland soils, as defined by the United States Department of Agriculture, are soils that are best suited to producing food, feed, forage, fiber, and oilseed crops. Such soils have properties that are favorable for economic production of high yields of crops. The soils need to be treated and managed using acceptable farming methods. The moisture supply must be adequate and the growing season must be sufficiently long. Prime farmland soils produce the highest yields with minimal inputs of energy and economy resources, and farming these soils results in the least damage to the environment.

Unique farmlands are farmlands other than prime farmlands that respond unusually well for the production of specialized crops, such as fruits, vegetables, and others.

Louisiana has 12,975,400 acres of soils that are recognized as prime and unique farmlands. There are 6,410,000 acres in use as cropland. The primary crops grown on these lands (in order of importance) are soybeans, rice, cotton and sugarcane. Some 2,387,000 acres are utilized for pasture, timber, or other uses.

Special consideration and/or emphasis should be placed on usages recommended for parcels that may contain prime or unique farmlands. Consultation with the Soil Conservation Service will be conducted prior to further BLM activities within areas considered to have high potential for prime and unique farmlands.

9. Vegetative Resources

The Federal Land Policy and Management Act of 1976, the Classification and Multiple Use Act of 1975, the Materials Act of 1947, and the National Environmental Protection Act of 1969 requires that the Bureau identify and evaluate vegetative resources which are located on public lands thus insuring that these resources are adequately addressed in the Bureau's planning system. Any vegetative resources of significant interest, economically or scientifically, which are identified through the Bureau's planning process may need individual management plans in order to develop or protect them.

The vegetative environment, within the State of Louisiana, is divided into two plant or vegetative biomes (major biological communities or natural groups of organisms characterized by certain "dominant" and "influent" plants). The two biomes are the grasslands and the deciduous forest communities (see Figure 14). That part of the environment described as being grasslands occurs mainly in southwestern Louisiana and is called the coastal prairie grasslands. There are other small scattered tracts of grasslands throughout most of the State. The major biome, being the deciduous forest, would be the dominant biome for the rest of the State. In order to more completely and adequately describe the environment for Bureau planning needs, the State can be subdivided into 6 separate areas involving 8 ecotypes. These ecotypes are based upon predominant vegetation for which the land has the most potential under most natural conditions. The source reference material for these ecotypes is the U. S. Geological Survey National Atlas of 1970. They are as follows:

Deciduous Forest Biological Community

Forest

1. Oak-Hickory-Pine Forest (Quercus-Carya-Pinus)
2. Southern Mixed Forest (Fagus-Liquidambar-Magnolia-Pinus-Quercus)
3. Oak-Hickory Forest (Quercus-Carya)
4. Southern Floodplain Forest (Quercus-Nyssa-Taxodium)

Grasslands-Forest

5. Blackbelt (Liquidambar-Quercus-Juniperus)
6. Live Oak-Sea Oat (Quercus-Uniola)

Grasslands

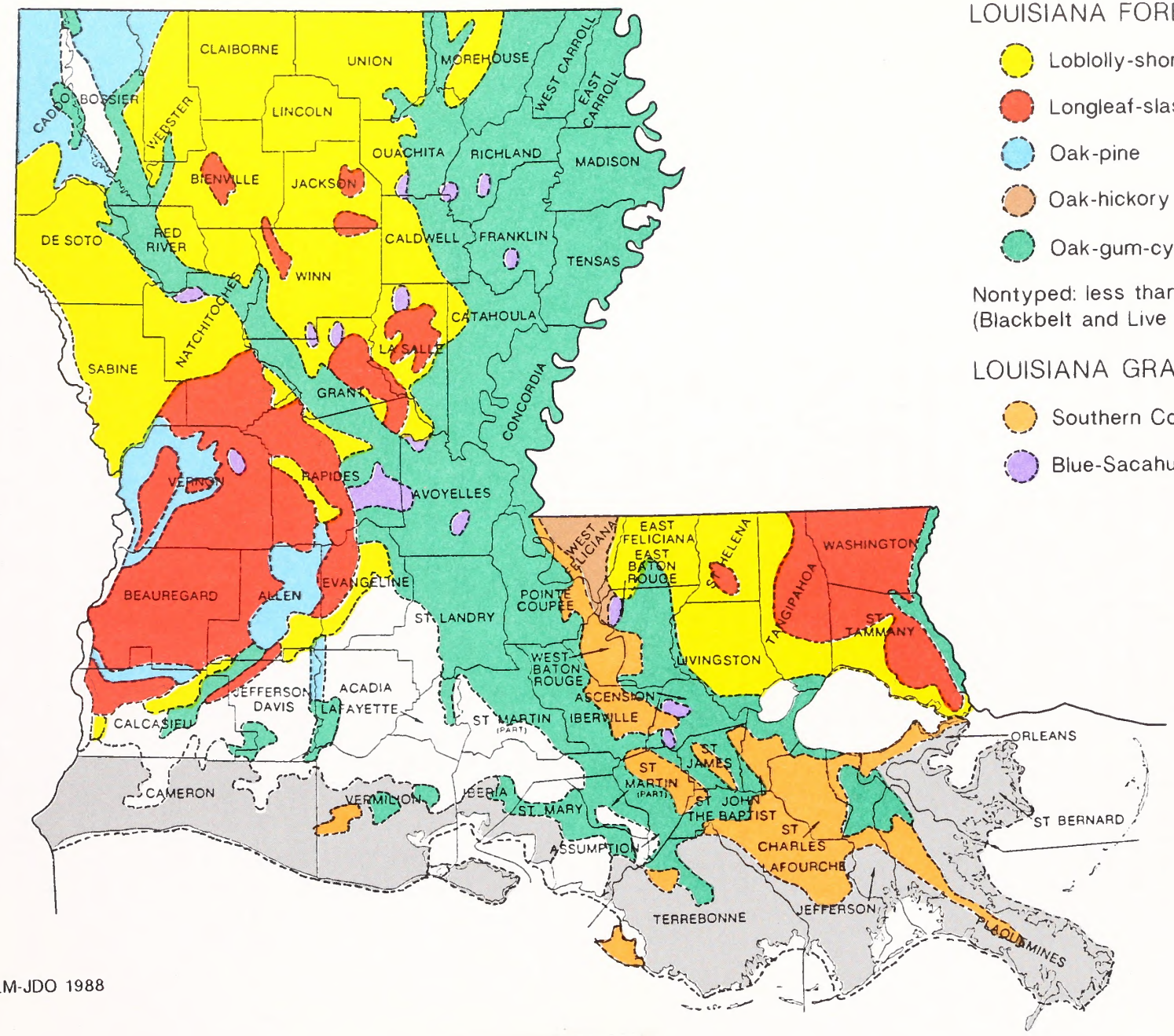
7. Southern Cordgrass Prairie (Spartina)
8. Blue-Sacahuista Prairie (Andropogon-Spartina)

The Bureau's policy concerning valuable vegetative resources, such as timber, is to develop such resources to there fullest potential economically while still maintaining environmentally sound management. Some of the Bureau's surface lands within the State may have limited amounts of timber

CHAPTER III,PAGE 85--FIGURE 14 CONTAINS ERRORS IN THE LEGEND.

ORANGE AND GREY REPRESENT SOUTHERN CORDGRASS PRAIRIE.
PURPLE SHOULD BE INCLUDED AS PART OF THE GREEN, REPRESENTING OAK-GUM-CYPRESS.
WHITE REPRESENTS BLUE-SACAHUISTA PRAIRIE.
GREY REPRESENTS SOUTHERN CORDGRASS PRAIRIE.

UNDER NONTYPED-BLACKBELT IS NOT KNOWN TO EXIST IN LOUISIANA. SEA OAKS SHOULD BE SEA OATS.



BLM-JDO 1988

Figure 14

resources on them and may, after the plan, be inventoried for economic values. At the present time no vegetative inventory exists. When the BLM undertakes an action on public domain lands in the future, each tract will be inventoried.

10. Cultural Resources

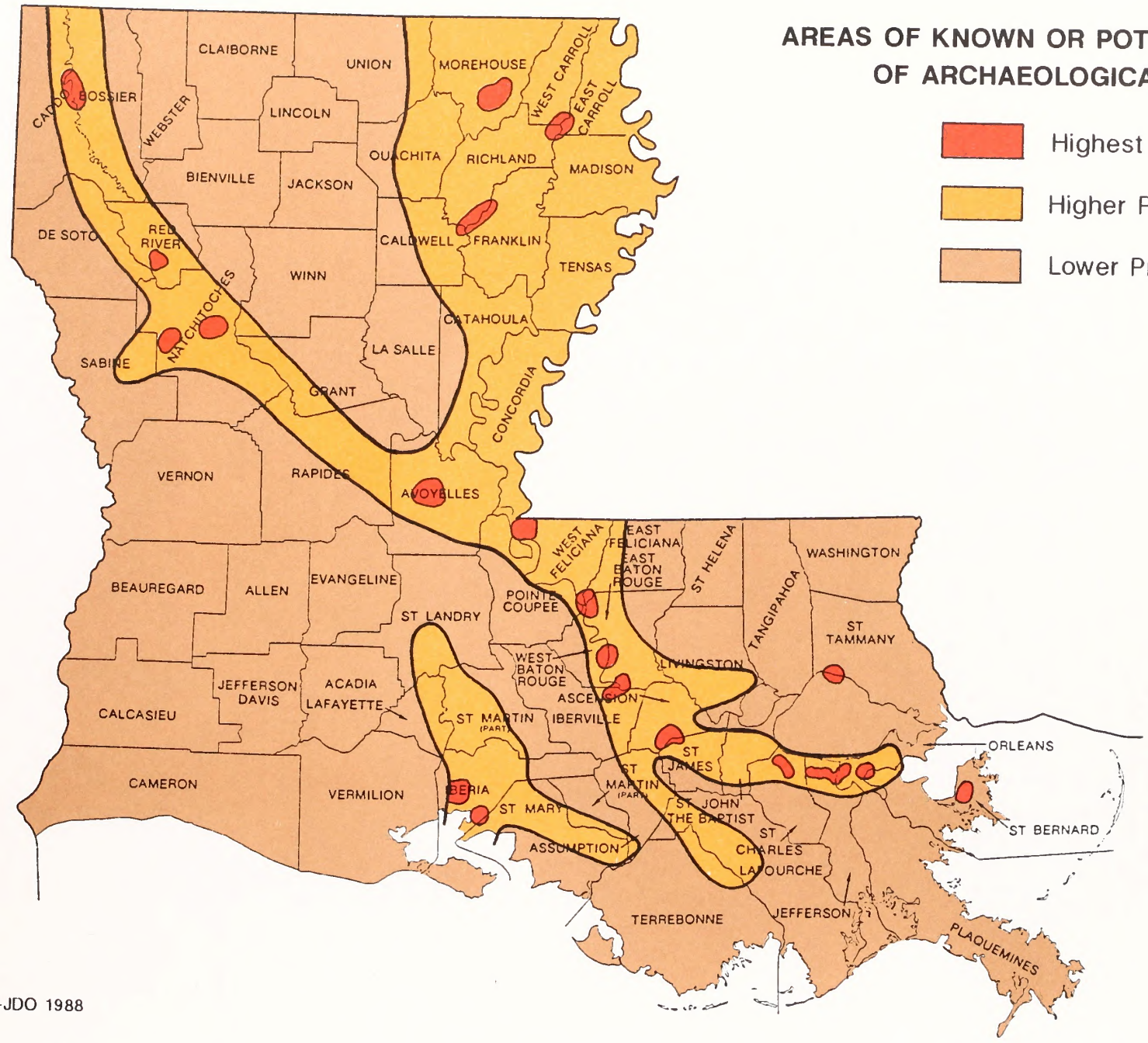
In accordance with regulations at 36 CFR Part 61 (Procedures for Approved State and Local Government Historic Preservation Programs), the State Historic Preservation Officer (SHPO) is responsible, among other things, for assisting Federal agencies in carrying out their historic preservation responsibilities. In the State of Louisiana, the Division of Archaeology within the Office of Cultural Development in the Department of Culture, Recreation and Tourism, is charged with the responsibility of identifying, managing and developing the State's archaeological resources for the public. The Assistant Secretary of the Office of Program Development acts as the SHPO.

To assist the BLM in the current planning effort, the Division of Archaeology was asked to identify any recorded archaeological sites located on BLM-administered tracts in Louisiana. In addition, the Division was asked to evaluate each of the parcels according to their potential (i.e., high, medium or low) for yielding significant cultural resources and make a recommendation for survey.

BLM surface-administered tracts in Louisiana are restricted to small, scattered parcels. The Division of Archaeology evaluated a total of 54 tracts, encompassing slightly more than 2000 acres. Eighteen of these parcels were deemed to have high site potential, 21 moderate potential, and 15 low potential; 36 of the 54 tracts were recommended for survey. Only two sites (16BI18, 16BO106) were tentatively identified on these tracts. (See Appendix 3.)

In addition, a map provided by the Division of Archaeology delineated known or potential areas with a high probability for containing archaeological resources (See Figure 15). It is generalized in nature. These high-probability zones include a 5 to 10 mile swath along either side of both the Red River and the Mississippi River. The magnitude of the areas encompassed makes it likely that these sensitive zones also include areas where few or no cultural resources exist or where the cultural resources are no longer extant. Clearly, any future BLM undertakings affecting these areas or any portion thereof will need to be carefully examined on a case-by-case basis to assess the extent of BLM surface and FMO involved.

The surface administered tracts in Louisiana represent only a small portion of BLM's responsibilities in the State. As has previously been noted, ESO administers approximately 1.2 million acres of FMO. The exact number of archaeological sites on FMO cannot be estimated since all FMO is not accounted for and is not precisely mapped. Although sites from all time periods and cultures may be represented on FMO lands, in reality, particular site types and time periods are likely to be more prevalent.



BLM-JDO 1988

Figure 15

Figure 15

Because of the disproportionate amount of FMO administered by ESO relative to public domain surface, the future management emphasis will focus on minerals management and development. Consequently, the cultural resources discussion emphasizes cultural resource concerns vis a vis energy-related development. Since existing Federal mineral leases are scattered throughout most parishes in the State, it is difficult to pinpoint particular areas where mineral exploration and development are likely to occur. To facilitate the discussion, therefore, the five terrestrial management units delineated in Louisiana's Comprehensive Archaeological Plan (Smith et al. 1983) will serve as a basis for a broad discussion of the existing cultural resource environment.

In managing Louisiana's cultural resources, the Division of Archaeology has divided the state into one underwater and five terrestrial management units (MU) (Figure 16). Parishes exhibiting similar patterns of topography, culture history and land use are grouped together as a management unit. Louisiana's regions of rolling uplands are generally incorporated by Management Units I and IV. Management Unit II consists of the northern portion of the Mississippi alluvial valley within the State. Management Unit III includes the prairies and coastal marsh. Management Unit V includes the Eastern Atchafalaya Basin, the lower Mississippi Alluvial Valley, and associated deltaic plain. Management Unit VI, which will not be considered in the following discussion, consists of all sub-aqueous lands that are controlled by Louisiana (Smith et al. 1983). Table 13 lists known archaeological sites by management unit.

Sixteen parishes are included in Management Unit I, a culturally diverse area located in the northwestern portion of the State. Numerous occupations are expected for the Paleoindian, Archaic, Caddo, early colonial and antebellum periods. Some 3019 archaeological sites in Management Unit 1 are recorded in the Division of Archaeology's records at this time. Most components are Archaic, Caddo, or early 20th century. Poverty Point components are absent, and Tchefuncte, Plaquemine and Mississippian components are rare(Smith et al. 1983).

The numerous archaeological sites in MU I are persistently threatened by development; most relevant from ESO's planning standpoint is energy-related development. "MU I is an extremely important area for extracting energy-related natural resources" (Smith et al. 1983). Louisiana accounts for 29% of the United States' oil and gas production, and MU I includes the majority of Louisiana's onshore oil fields. "Oil fields are found in Caddo, Webster, Claiborne, DeSoto, Red River and Sabine parishes"(Smith et al. 1983). Oil production has declined since the 1970s, although it is expected to increase in the future. Natural gas is produced everywhere in MU I with the exception of Vernon, Rapides, Grant and parts of DeSoto, Natchitoches and Winn Parishes (Smith et al. 1983).

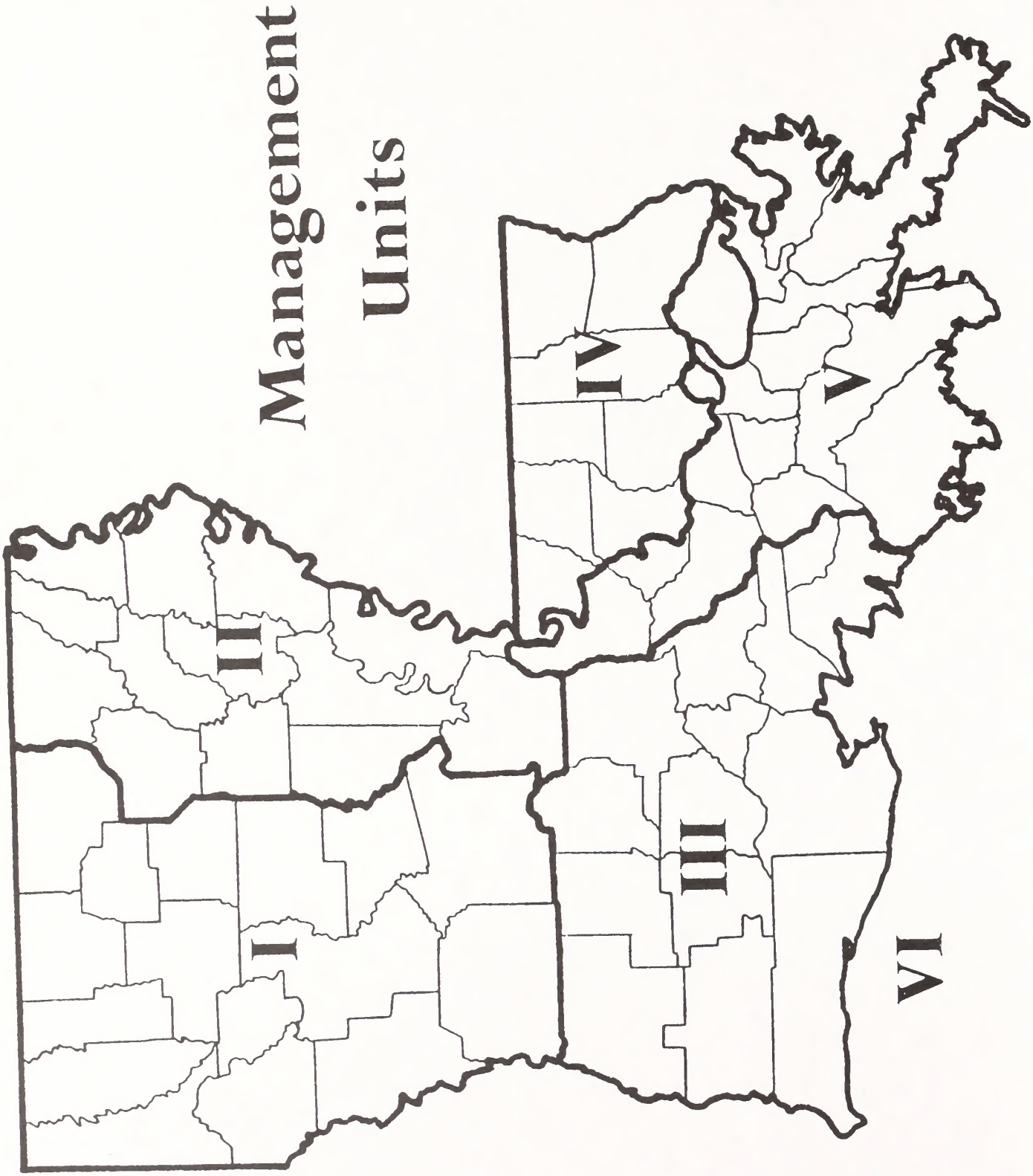


Figure 16

TABLE 13

KNOWN ARCHAEOLGOICAL SITES BY MANAGEMENT UNIT

MU No. I	
Bienville	88
Bossier	175
Caddo	183
Claiborne	31
Desoto	240
Grant	163
Jackson	6
Lincoln	7
Natchitoches	252
Rapides	367
Red River	242
Sabine	106
Union	51
Vernon	906
Webster	80
Winn	122
	3019

MU No. II	
Avoyelles	83
Caldwell	66
Catahoula	301
Concordia	120
East Carroll	144
Franklin	232
La Salle	99
Madison	174
Morehouse	120
Ouachita	196
Richland	219
Tensas	87
West Carroll	78
	1919

MU No. III	
Acadia	41
Allen	29
Beauregard	54
Calcasieu	195
Cameron	129
Evangeline	47
Iberia	91
Jefferson Davis	38
Lafayette	28
St. Landry	75
St. Martin	182
St. Mary	135
Vermilion	55
	1099

MU No. IV	
East Baton Rouge	66
East Feliciana	57
Livingston	66
St. Helena	83
St. Tammany	129
Tangipahoa	55
Washington	127
West Feliciana	46
	629

MU No. V	
Ascension	35
Assumption	45
Iberville	69
Jefferson	143
Lafourche	83
Orleans	108
Plaquemines	122
Pointe Coupee	51
St. Bernard	145
St. Charles	48
St. James	44
St. John the Baptist	26
Terrebonne	184
West Baton Rouge	14
	1117

The possibility for future surface mining of lignite is also extremely critical to cultural resource planning. Lignite resources in Louisiana may total a billion tons. "Only Rapides, Vernon and parts of Grant parishes may be excluded from this ground-disturbing activity"(Smith et al. 1983). If surface mining intensifies in MU I, the protection and avoidance requirements of cultural resources must be considered during the early planning stages of mining activities.

Management Unit II includes the 13 parishes located in the northeastern corner of the State. The particularly widespread archaeological manifestations in MU II include most of the non-Caddo mound complexes. The type sites of the Poverty Point, Marksville, and Troyville-Coles Creek cultures are located in this region (Smith et al. 1983).

Some 1919 archaeological sites are known in MU II. The majority of the known components represent the Archaic, Marksville, Troyville-Coles Creek, and Industrialization and Modernization phases. The Paleoindian, Tchefuncte, Historic Contact, and Exploration and Colonization phases are represented by relatively few components (Smith et al. 1983).

Agriculture is the dominant land use in MU II. Overall, industry is not a major factor in MU II, although lignite mining has potential for growth in Morehouse, West Carroll, East Carroll, Richland, Ouachita and Caldwell Parishes. "Oil fields are found in the southern parishes of MU II along the LaSalle, Concordia, Tensas line with some fields extending north into Franklin" (Smith et al. 1983:51). Large oil fields are present in La Salle Parish, where the industry employs a significant work force. The distribution of natural gas parallels that of lignite. The overall feeling among State planners is that as long as surface mining does not significantly increase in MU II, the "energy-related industry will not be as important a threat to cultural resources here as it is in MU I"(Smith et al. 1983).

Management Unit III is composed of 13 parishes in southwestern Louisiana. From an archaeological perspective, it is probably the least understood of all the State's management units. Some 1099 archaeological sites have been recorded in MU III. Coles Creek components are most frequently recorded. Paleo-Indian, Poverty Point, Historic Contact, and Exploration and Colonization components are rare or nonexistent.

MU III was in a peripheral area with respect to many prehistoric and historic cultural developments. The colorful history of the region is marked by Spanish and Acadian influences. The western area was once a buffer zone between Spanish Texas and French Louisiana. Euro-Americans settled the area later than much of the rest of Louisiana (Smith et al. 1983).

Agriculture is the primary land use within Management Unit III. Oil and gas exploration occurs in all parishes within MU III and is particularly concentrated in St. Mary, Acadia, Evangeline and Calcasieu Parishes. As of 1983, parishes in MU III produced approximately 22% of the crude oil and 52% of the natural gas in Louisiana (Smith et al. 1983).

Eight parishes are included within Management Unit IV, located north of Lake Pontchartrain in southeastern Louisiana. Smith et al. (1983) have summarized the culture history of this region as follows:

> The region has a distinctly different culture history than the rest of Louisiana. Most of the prehistoric sites are small lithic concentrations. Mounds and large villages are uncommon. Historically, the "Florida Parishes" were tied to the upland south cultural tradition. West and East Feliciana parishes are somewhat exceptions to this, in that these areas saw the development of a plantation system of agriculture.

There have been 629 archaeological sites recorded in Management Unit IV. Archaic sites are the most common identified, followed by sites of the Industrialization and Modernization period. Paleo-Indian, Poverty Point, Mississippian, and Exploration and Colonization period sites occur in the lowest frequencies (Smith et al. 1983).

Greater than 50% of the land area of MU IV is covered by forest, and manufacturing of paper and wood products is a principal industry in the northern region. Twenty-five percent of the land area is utilized for agriculture (Smith et al. 1983). Energy-related development is not considered a significant factor affecting archaeological sites in this management unit.

Fourteen parishes make up Management Unit V, which is located south of MU IV in southeastern Louisiana. MU V is of recent geologically origin; the dominant feature is the Mississippi River (Smith et al. 1983).

MU V is rich in cultural resources. "The region contains significant remains of aboriginal settlement from Poverty Point until contact with Europeans. Most of the early permanent Euro-American settlement began in this region, principally along the Mississippi River and Bayou Lafourche" (Smith et al. 1983).

There have been 1117 sites recorded. Most of the recorded components date to the Troyville-Coles Creek period and the late nineteenth and twentieth centuries. Poverty Point and Historic Contact period sites are the least common, and Paleo-Indian, Archaic and Caddo sites are absent (Smith et al. 1983).

Most of the area within Management Unit V consists of water and wetland. Although their suitability is low for habitation or agriculture, these wetlands possess important minerals, most notably oil and gas (Smith et al. 1983):

> In 1971, more than 40% of the total crude oil production in Louisiana was concentrated in the Terrebonne, La Fourche, Jefferson and Plaquemines area. During that year, 450 million barrels of crude oil were extracted. In 1979, 61% of Louisiana's crude oil production and 36% of natural gas production was concentrated in this management unit.

As a result of the energy-related industry, historical archaeological sites in particular are in jeopardy. "This problem is extremely critical along the Mississippi River, where various...energy-related industries are competing for riverfront space" (Smith et al. 1983). Unfortunately, this same area was also "the focus of early Louisiana settlement, and later, sugar plantation culture" (Smith et al. 1983). In sum, sites along the Mississippi River are rapidly disappearing.

Energy-related industries probably offer the greatest potential for future ground-disturbing activities within portions of the State, specifically Management Units I, III and V. Most oil and gas activities within the state will disturb only small parcels of land, or cause linear disturbances from pipelines. By contrast, surface mining, which may increase in the future, particularly in Management Units I and II, could disturb large tracts of land and affect many archaeological sites. If surface mining intensifies in these management units and it overlaps with areas where the BLM owns lignite, cultural resources will need to be considered early in the planning of mining activities so as to address the protection of important cultural values. Without careful planning of land use areas, the cost of the energy-related industry will be the gradual destruction of our cultural heritage.

Leasing of minerals, particularly oil and gas by BLM only indirectly contribute to the gradual disappearance of archaeological sites by creating a favorable environment for exploration and development. The term indirectly is used because an undertaking's direct and predictable indirect environmental impact must still be determined by the BLM and procedural requirements of Section 106 adhered to before a project may be approved.

The management emphasis on FMO tracts where significant resources occur will be avoidance, wherever possible. Excavation will only be undertaken where options for avoidance have been discarded as unfeasible.

For surface parcels with significant resources, the management emphasis will be transfer to another Federal, State or local jurisdiction with on-site management capabilities. Where an appropriate transferee cannot be identified because, for example, a particular parcel is too remotely located from an established administrative unit, mitigation may be undertaken if costs are reasonable.

Another possible option will be to transfer or sell the parcel to a private landowner who has indicated a willingness to enter into a cooperative agreement with the Department of Culture, Recreation and Tourism under the landmark program. Under this program, the owner of a privately owned State Landmark (the particular resource would have to be registered as one) agrees to restrict development on his/her property at a level he/she feels is compatible with his/her own land use plans. For example, a farmer may agree to plow his/her field no deeper than 12 inches to protect an archaeological site from disturbance. The agreement can be as minimal or

comprehensive as the landowner and the state feel is appropriate for the property involved. Where all other options for transfer of a significant property have been exhausted, BLM will retain and manage unique and specific sites.

11. Visual Resource Management

Within Louisiana, the very nature of the small, scattered BLM-administered public land parcels poses a problem for effective application of visual resource management (VRM). VRM is geared to large expansive areas which can be viewed from major highway routes. The eight cleared parcels in Louisiana are too small for viable visual resource potential. Furthermore, assignment of various VRM management classes within a given land parcel is not likely to be accomplished based on its limited viewing area.

From the standpoint of key observation position (KOP), there are very few parcels that can be observed from major travel routes or public use areas. Most tracts fall in the category of "seldom-seen zones" because they are located beyond the 15-mile limit from a KOP or cannot be observed at all because of intervening vegetation or cultural modifications on non-public lands from a well-traveled public access point.

At this time, there is no existing data available for each Louisiana public land parcel in regard to scenic quality. On-site inspections to locate KOPs have not been conducted. It is likely that the majority of the Louisiana public lands will have low public concern for visual resource values.

12. Wilderness Values

In accordance with Section 603(a) of FLPMA, the Eastern States Office has inventoried the public domain in Louisiana for its Wilderness potential. Since the Bureau administers no upland tracts in the State of 5000 acres or more, the Wilderness review was restricted to roadless islands. Two islands in Louisiana with a total acreage of only 4.39 acres were tentatively identified as administered by BLM. These units were intensively inventoried and were found lacking Wilderness characteristics.

During the 90-day public comment period, two written comments were received on BLM's proposal to drop the subject islands from further Wilderness review; both comments agreed with BLM's decision. The final Wilderness inventory decisions for Louisiana were announced in a March 29, 1984 Federal Register notice (49 FR 12330).

The only designated Wilderness Area in Louisiana is administered by the Department of Agriculture--Forest Service in the Kisatchie National Forest. The 8,700-acre Kisatchie Hills Area was designated on December 22, 1980 under the Colorado National Forest Wilderness Act. Two areas which were studied six years ago during the Forest Service's RARE II (Roadless Area Review and Evaluation) are being re-evaluated in the Forest Planning process. The areas include Cunningham Brake - 2,100 acres and Saline Bayou - 6,479 acres.

13. Areas of Critical Environmental Concern

No areas of critical environmental concern (ACEC) have been designated for any of the subject parcels. This does not preclude the possibility of identifying ACEC's as more information becomes available later. However, the parcels are believed to have low potential for ACEC designation based on all information currently available.

14. Socio-Economic Analysis

a. Population

The State of Louisiana had a 1980 population of just over 4.2 million, which represented a 15.4 percent increase over the 1970 figure of 3,644,637. It ranked 19th among states in population in 1980. The top five parishes in population in 1980 were in rank order Orleans, Jefferson, East Baton Rouge, Caddo and Caleasieu. The largest towns were: New Orleans, Baton Rouge, Shreveport and Metairie. There are seven Standard Metropolitan Statistical Areas (SMSA)--Alexandria, Baton Rouge, Lafayette, Lake Charles, Monroe, New Orleans, and Shreveport.

The population in 1980 was 29.4 percent black, and 2.4 percent of Spanish origin; 63 percent male (for those persons 15 and older); 9.6 percent aged 65 and older; 31.6 percent under 18; had a median age of 27.3; included almost 128,000 families which spoke French; almost 58 percent of the persons 25 or older had completed high school; had 31.4 percent residing in rural areas; and had a capital income of $6,430.

Population projections to the year 2000 were developed by the University of New Orleans Division of Business and Economic Research and the Louisiana State Planning Office in 1983. These projections gave a range of figures based on the level of immigration. The growth from 1980 to the year 2000 is projected to range from 19 percent (to 5,205,692) with low immigration, to 23 percent (to 5,496,835) with medium immigration, and 28 percent (to 5,835,732) with high immigration.

b. Economy

The employment base of the State of Louisiana is basically service and trade oriented. The 1980 Census indicates the the major industrial sector with regard to number of persons employed was wholesale and retail trade, followed by professional and related services. Together they accounted for 41 percent of the total employed persons 16 and over in 1980. Out of twelve industrial sectors mining was 9th, while agriculture, forestry and fisheries was 11th. Significant is the fact that mining almost doubled in number of persons employed from 1970 to 1980.

With regard to payroll, the relative importance of the mining industrial sector shifts. In the 1983 County Business patterns, the total annual payroll in the State was just over $20.5 billion, mining is 4th accounting for more than 10 percent or $2.4 billion.

Wholesale and retail trade contributed the highest payroll with almost $4.3 billion annually, followed by manufacturing with just over $4 billion and services with just under $4 billion. Agriculture, forestry and fisheries was the lowest sector accounting for only $59 million in annual payroll.

The earnings by industry from 1978 to 1983 are shown in Table 14 below.

An analysis of earnings by industry and parish indicates that St. Helena (which only had 366 total employees) and Cameron parishes had the greatest percent of mining employment in 1983, with 18.9 and 18 percent, respectively. (See Figure 17.) They are followed by Lafayette, LaSalle, Vermillion, Plaquemines and Terrebonne parishes.

The greatest number of mining employees are in Orleans and Lafayette parishes. The majority of mining employment was involved with oil and gas, with some involved in rock salt production (Iberia and St. Mary's) and sand and gravel (in 7 parishes). Only four (4) parishes (East Carroll, West Carroll Madison and Washington) had no employment in oil and gas. Only East and West Carroll Parishes have no oil or gas production.

Mining contributes more to the economy of Louisiana than direct and indirect income, however. There are oil and gas severence taxes, petroleum products taxes, the States' share of Federal mineral royalties, other lease and royalty income, etc. In 1983 alone, Louisiana had $545 million in lease and royalty income, $860 million in oil and gas severence taxes and $187 million in petroleum products taxes. That same year, BLM received over $1.3 million from mineral leases and permits, a portion of which is given to the State.

Because of the State's heavy dependence on the oil and gas industry, the drop in oil prices early in 1986 has devestated the economy. Unemployment figures are among the worst in the nation and government services, which are heavily dependent on mineral production-related receipts, have been severely cut back. BLM's oil and gas related activities have also been depressed. To dramatize the importance of oil and gas to the Louisiana economy, the State recently released figures showing that a $1.00 drop in the per barrel price of crude oil costs the State 30 million dollars.

Table 14
Earnings by Place of Work in Louisiana from 1978 to 1983

	1978	1979	1980	1981	1982	1983
Earnings by industry:						
Farm	458,102	572,916	299,372	353,075	378,071	462,116
Nonfarm	20,889,682	23,735,800	27,201,942	31,106,241	32,540,980	32,756,735
Private	17,566,113	20,093,136	22,960,813	26,324,821	27,186,102	27,144,140
Agricultural services, forestry, fisheries & Others	90,564	103,996	103,264	109,215	113,255	114,267
Mining	1,501,589	1,813,162	2,327,612	2,918,681	3,135,788	2,663,244
Construction	2,177,956	2,499,587	2,889,489	3,185,370	2,980,243	2,925,109
Manufacturing	3,695,890	4,151,204	4,693,522	5,420,628	5,306,091	4,990,929
Nondurable goods	2,074,184	2,292,206	2,569,019	2,911,845	2,958,531	2,993,955
Durable goods	1,621,706	1,858,998	2,124,503	2,508,783	2,347,560	1,996,974
Transportation & Public Utilities	2,099,537	2,451,308	2,779,859	3,138,549	3,270,900	3,245,251
Wholesale trade	1,502,007	1,734,741	1,951,143	2,201,277	2,218,095	2,130,319
Retail trade	2,222,791	2,440,103	2,635,404	2,921,386	3,061,637	3,278,906
Finance, Insurance & Real Estate	1,002,615	1,125,249	1,227,788	1,355,680	1,448,329	1,653,078
Services	3,323,569	3,642,664	4,241,129	4,781,420	5,354,878	5,612,595
Government & government enterprises	3,323,569	3,642,664	4,241,129	4,781,420	5,354,878	5,612,595
Federal, civilian	576,388	624,307	683,991	739,455	778,154	837,672
Military	339,550	348,055	383,925	447,942	527,277	563,684
State and local	2,407,631	2,670,302	3,173,213	3,594,023	4,049,447	4,211,239

Source: Local Area Personal Income, U.S. Bureau of the Census, 1984

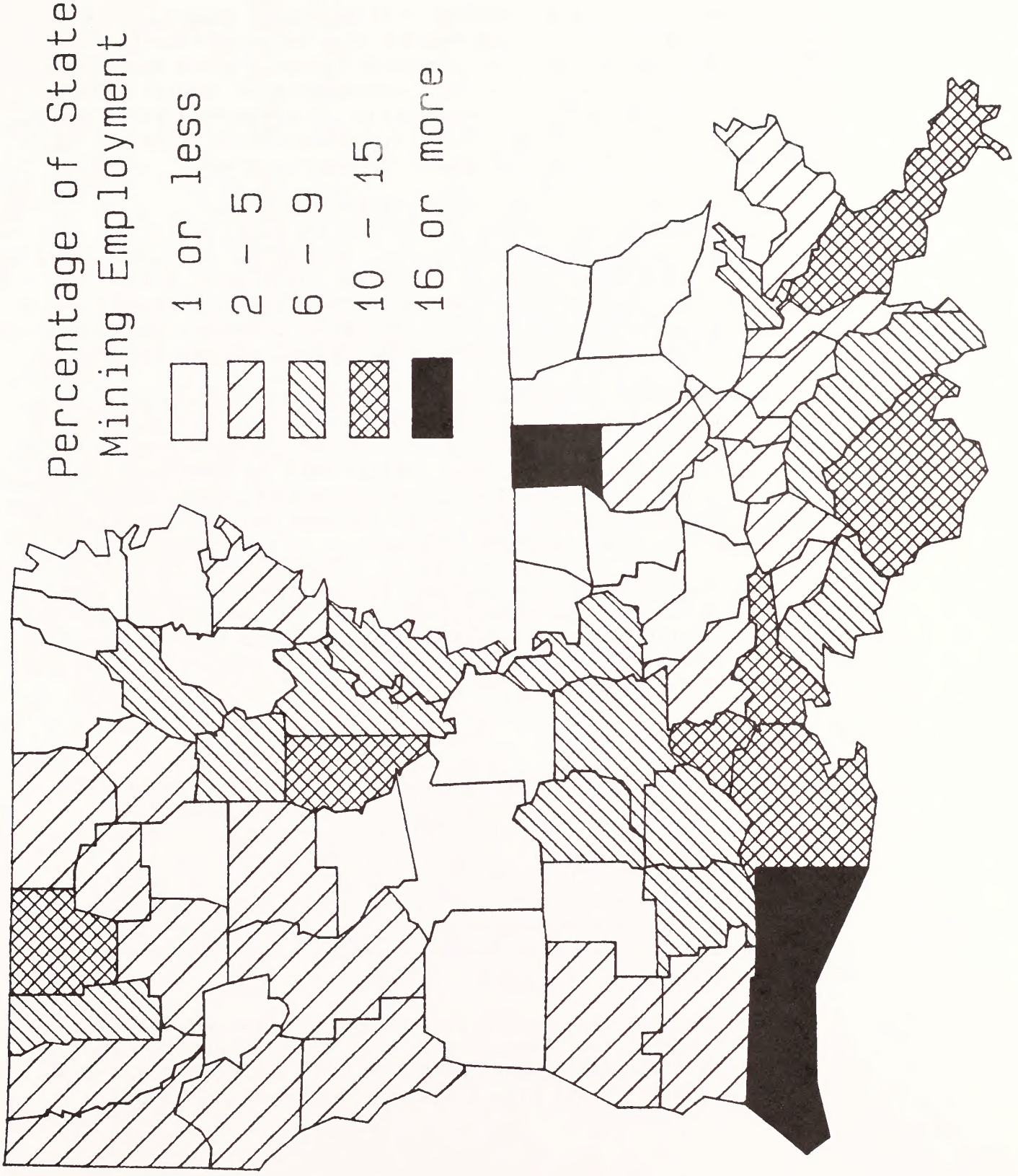

Percentage of State
Mining Employment
1 or less
2 - 5
6 - 9
10 - 15
16 or more

Figure 17

15. Recreation

The State of Louisiana Office of State Parks, Department of Culture, Recreation and Tourism administers two categories of parks--State Parks and State Commemorative Areas. State Parks were essentially established for outdoor recreation in a natural setting. State Commemorative Areas were established to preserve a specific historical or cultural theme. There are eleven State Parks and 18 State Commemorative Areas located throughout the State.

The State maintains five other public recreation areas--Louisiana State Arboretum, Bogue Falaya Park, Cotile Recreational Area, Crooked Creek Recreational Area, and Indian Creek Recreational Area. Additionally, there are 37 State Wildlife Management Areas and four (4) State wildlife refuges. Figure 7 shows the general location of the State Parks, Commemorative Areas, recreation areas, wildlife management areas and wildlife refuges.

The Jean Lafitte National Historic Park and Preserve is located in the Barataria Marsh in Jefferson Parrish near New Orleans. It is Louisiana's first major national park. It has an 8,000 acre core area acquired by the National Park Service with an additional 12,000 acres of private land managed as a park protection zone. The Chalmette National Historic Park in St. Bernard Parrish is managed by the Park Service along with the Lafitte.

The U.S. Forest Service operates 15 developed recreation areas on the Kisatchie National Forest. The U.S. Fish and Wildlife Service manages 10 national wildlife refuges throughout the State. Figure 18 shows the general location of the Federal parks, recreation areas and wildlife refuges discussed above.

16. Transportation

Louisiana's major Federal Highways and Interstate Systems are depicted on Figure 19. There are some 718 miles of interstate highways consisting of two major East-West arteries (one with a spur bypassing New Orleans--I-10/ I-12) and two North-South arteries, which terminate in New Orleans (I-55 and I-59). A third North-South Highway (I-49) is being constructed from Shreveport to Lafayette. These highways connect the major population centers within the State. A complex network of State and Parish highways complete the State's system.

The State also has an extensive network of railroad lines operated by some 14 rail companies. There are also numerous pipe lines for the transport of petroleum products. In 1981, there were 94 gas pipe lines, 39 oil pipe lines and 33 product pipe lines.

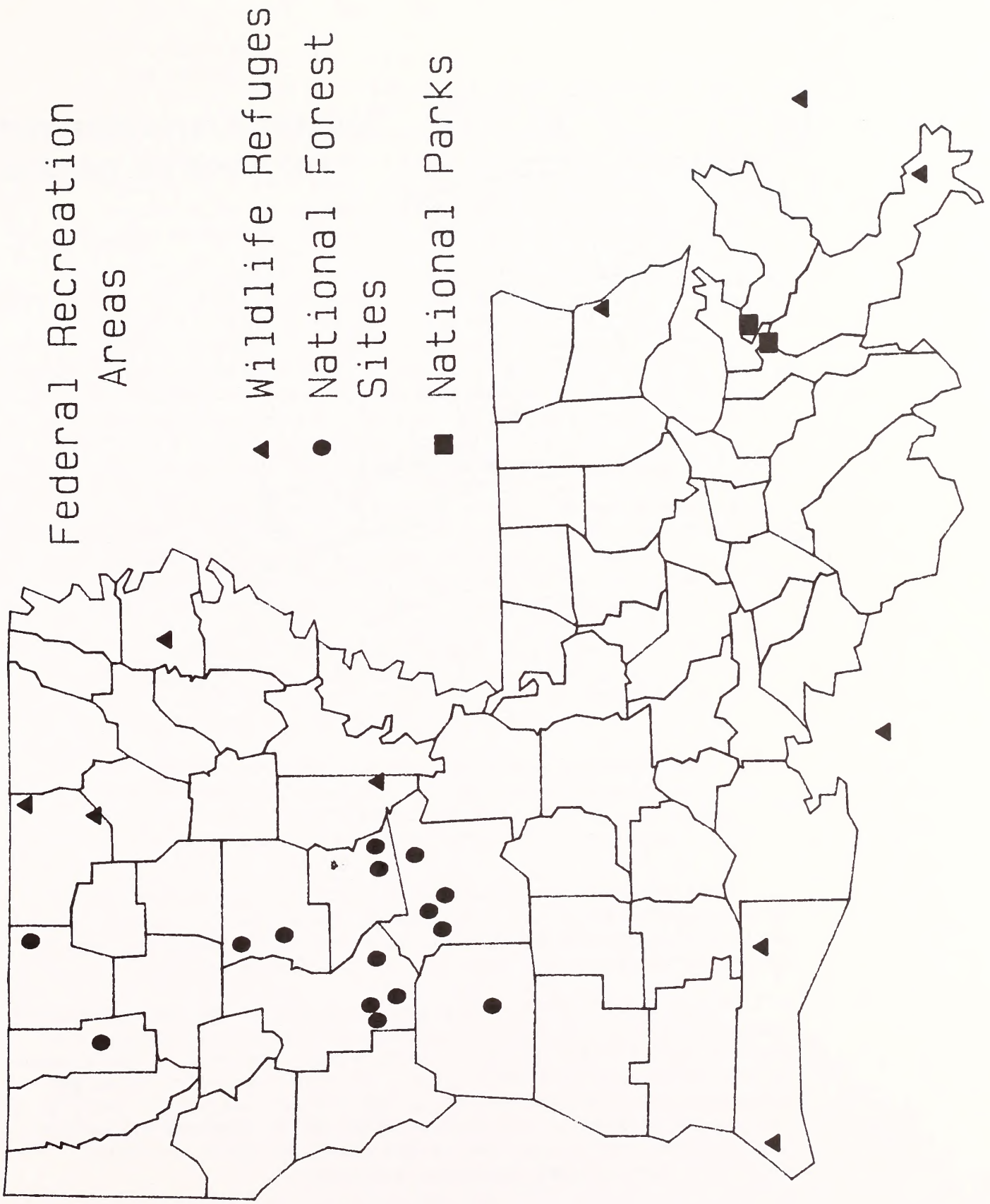
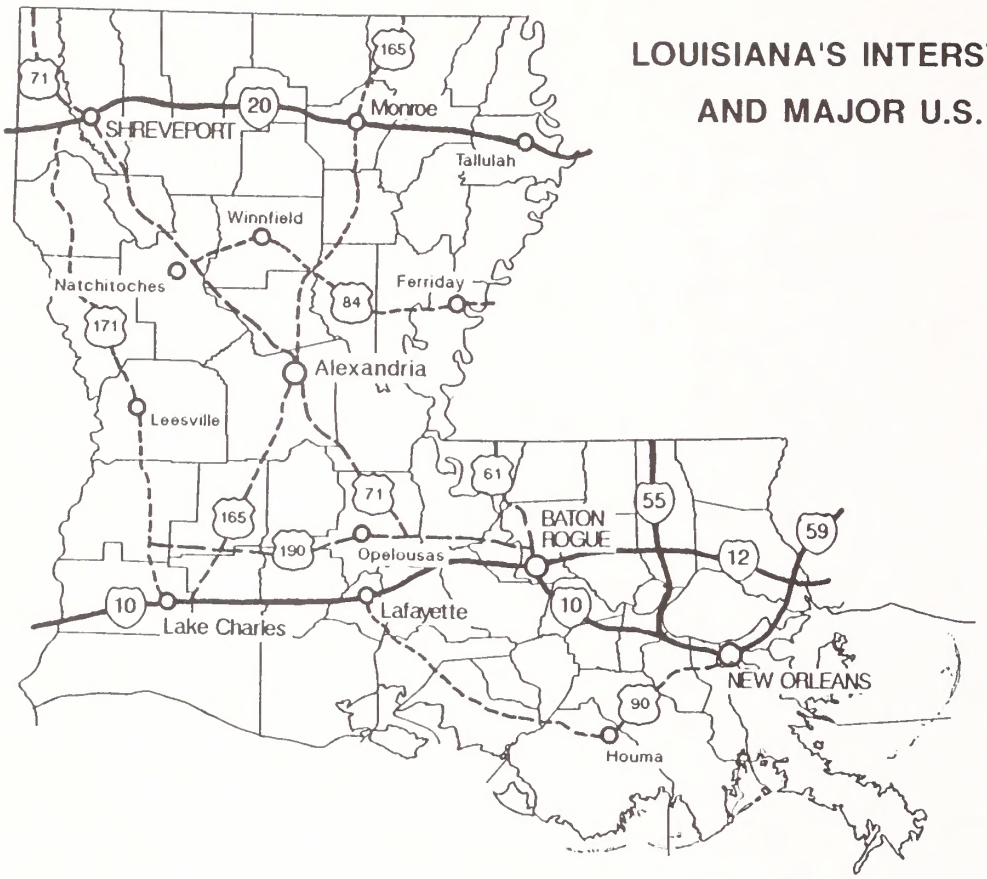

Federal Recreation Areas
Wildlife Refuges
National Forest Sites
National Parks

Figure 18

Figure 19

LOUISIANA'S INTERSTATE SYSTEM AND MAJOR U.S. HIGHWAYS



Most parishes are served by at least one general aviation airport (with 166 in the State, 90 of which are open to the public). Additionally, mainly because of the needs of the large oil and gas industry, there are 202 heliports and 21 seaplane bases.

There is an intricate navigation system in the coastal area of Louisiana and on the Mississippi River. Therefore, shipping has evolved into a major industry in the area. The Port of New Orleans is the world's largest grain port. In terms of dollar value and waterborne tonnage handled, it is the largest seaport in the U.S. and the second largest in the world. Other major commodities handled include crude petroleum, fabricated steel, metallic minerals, chemicals, and refined petroleum products.

Finally, the intercoastal waterway connects Louisiana with Texas to the West and runs eastward all the way to Florida.

17. Hazardous Waste

Section 3016 of the Resource Conservation and Recovery Act (RCRA), as amended in 1984, requires all Federal agencies to ". . . undertake a continuing program to compile, publish, and submit . . ." an inventory of hazardous waste sites owned or operated by, or located on, lands under the jurisdiction of such agencies. This inventory is to be submitted to the Environmental Protection Agency (EPA) every two (2) years. This began in January, 1986.

An inventory of EPA Hazardous Waste Sites in Public Domain States in the Southeast (including Louisiana) was performed in October, 1984. A BLM public lands list, BLM county maps, and an EPA-ERRIS printout (dated February, 1985) were utilized. The ERRIS printout identifies each EPA site location utilizing latitude and longitude coordinates. At the time of the inventory, there were no hazardous waste sites located on public lands.

In April, 1985, an updated inventory of hazardous waste sites in Louisiana was completed. At this time there were a total of 203 Hazardous Waste sites in Louisiana listed on the EPA-ERRIS printout; however, there were only seven (7) of the hazardous waste sites located within two (2) miles of BLM public lands. None of these were located on public lands. (See Table 15 for the sites). Specific locations for these sites are shown on Figures 20, 21, 22, 23, and 24.

An inventory of the EPA Open Dumps indicated there are approximately 150 dumps in the State of Louisiana, as listed by the EPA. There is no indication that any of these dumps are located on, or within two (2) miles of, BLM lands.

These two inventories of the best available data indicate that the BLM does not, and has not, operated a hazardous waste facility regulated under the RCRA within the State of Louisiana. BLM will continue to monitor sites bi-annually in accordance with RCRA.

Public Lands:	County	USGS Quad	Township	Range	Section
	Caddo	North Highlands 7.5	18N	14W	14

Waste Facility:	EPA I.D. No.
Universal Oil Products	LAD008051005

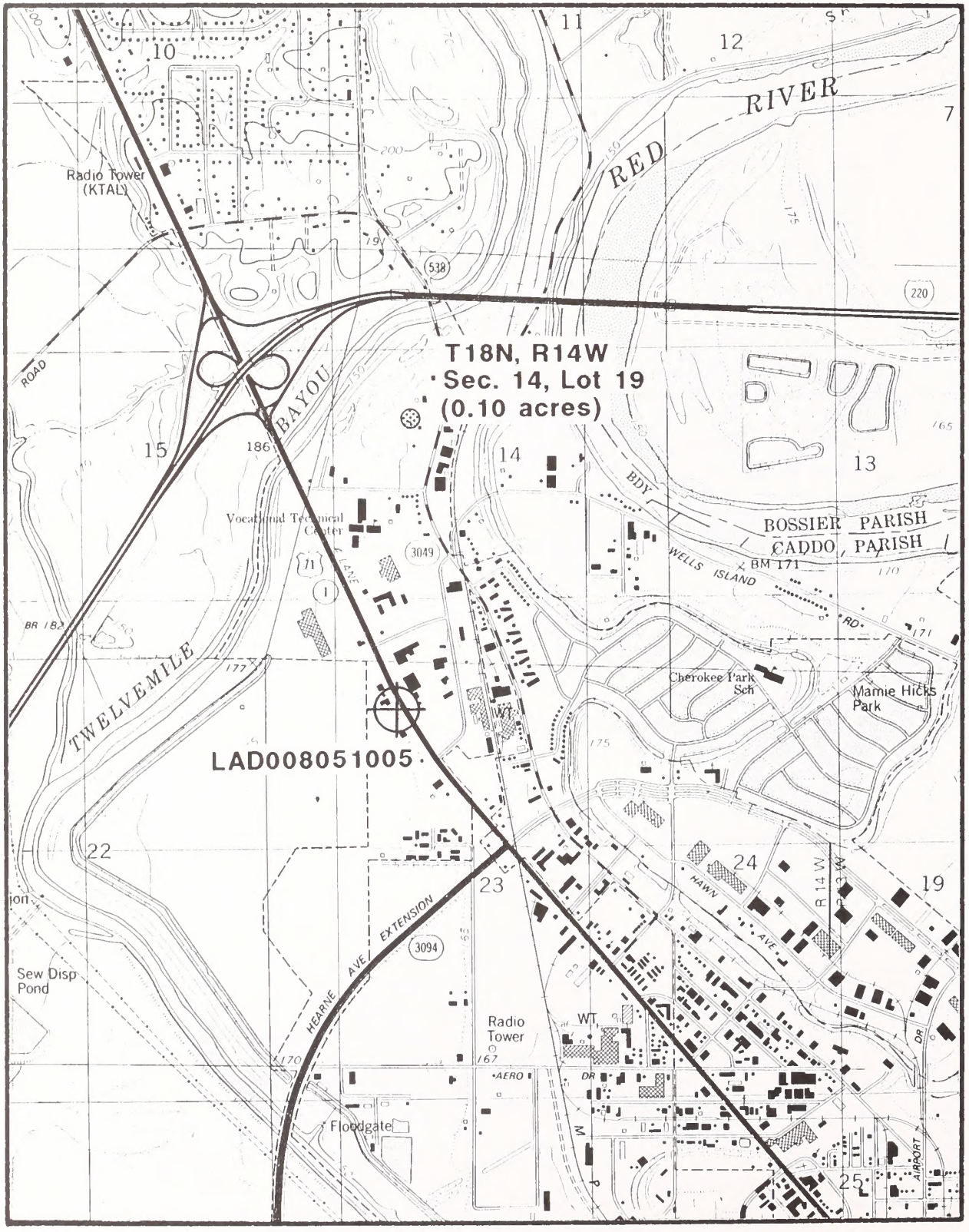


Figure 20

Public Lands:	County	USGS Quad	Township	Range	Section
	Caddo	Bossier City 7.5/ Shreveport East 7.5	17N	13W	9

Waste Facility:	EPA I.D. No.
Crow Property	LAD908749881

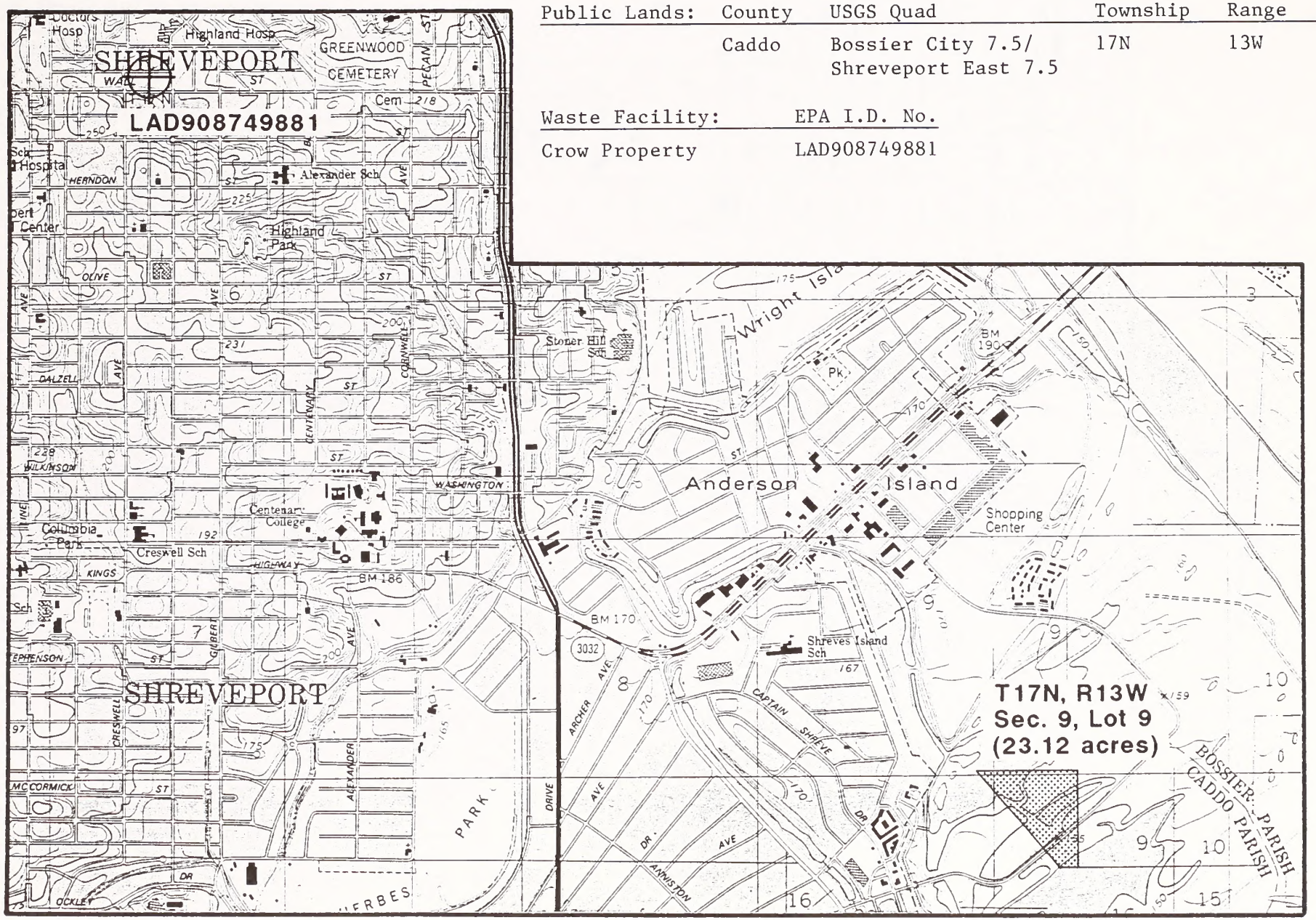


Figure 21

Public Lands:	County	USGS Quad	Township	Range	Section
	Caddo	Shreveport West 7.5	17N	14W	8

Waste Facility:	EPA I.D. No.
Atlas Processing Co.	LAD008052334
Electyrotechnics Corp.	LAD00225839

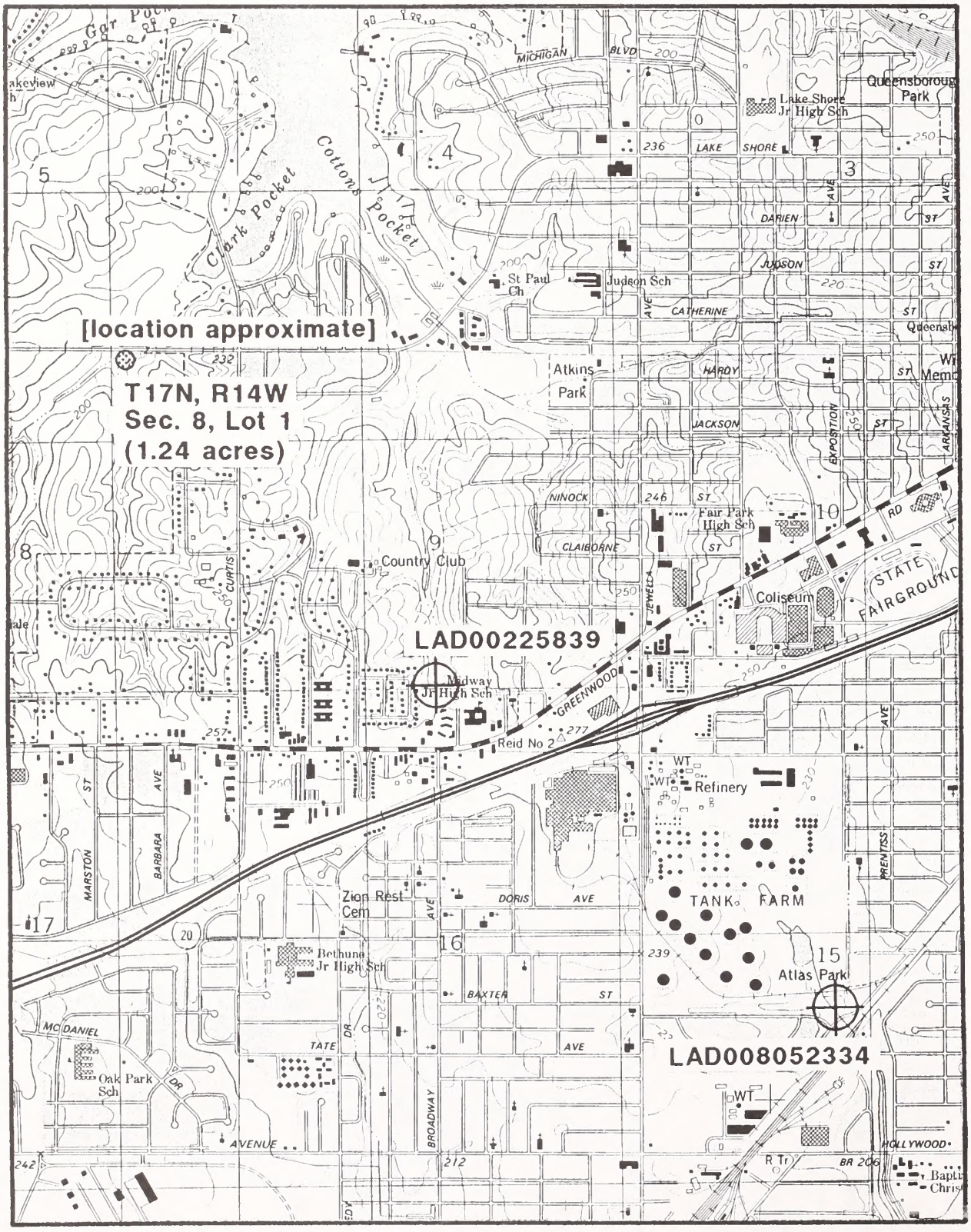


Figure 22

Public Lands:	County	USGS Quad	Township	Range	Section
	Ascension	Gonzalas, La. 7.5/ Carville, La. 7.5	10S	2E	83

Waste Facility:	EPA I.D. No.
Dutchtown Reclamation Facility.	LAD980879449

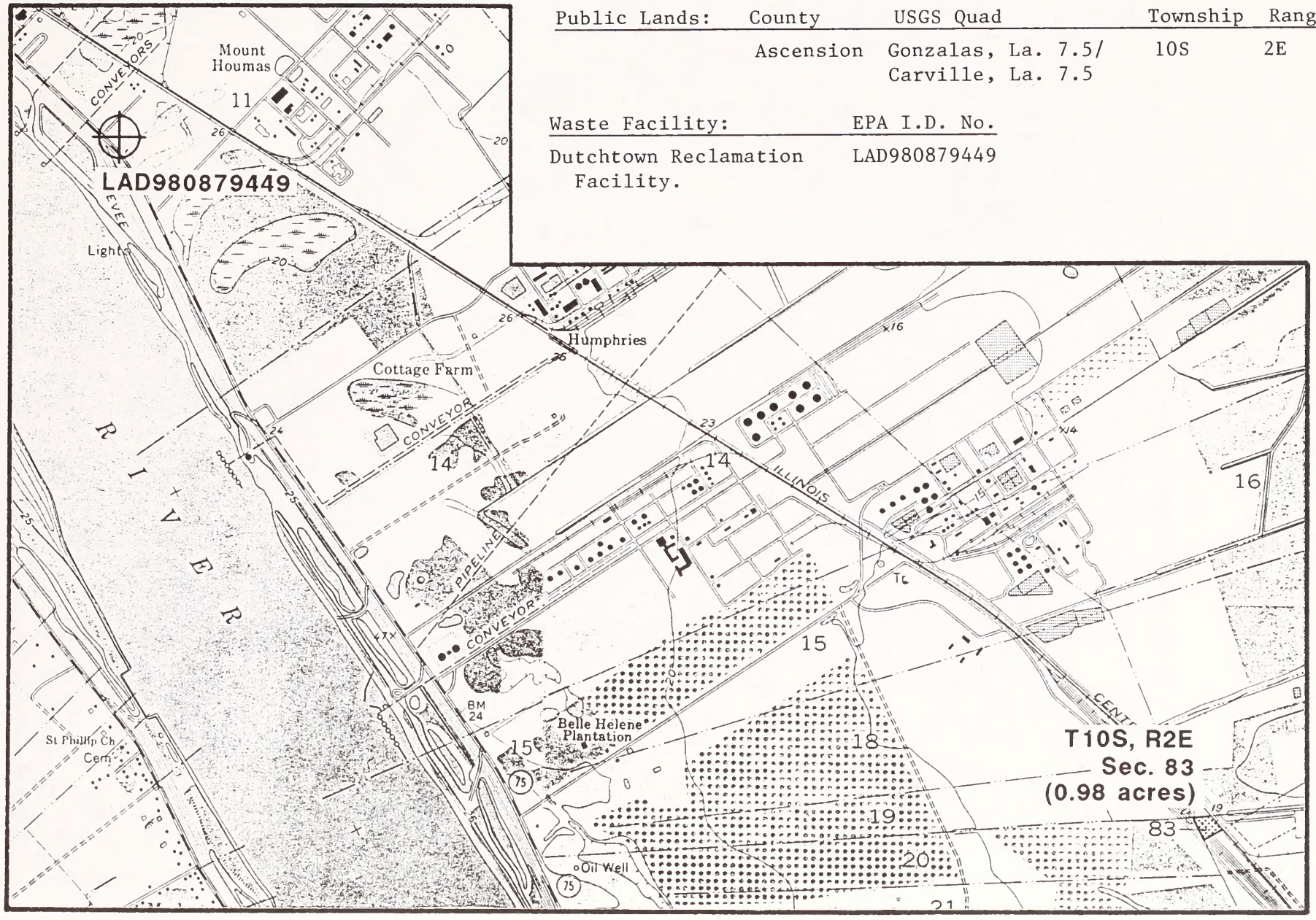


Figure 23

Public Lands:	County	USGS Quad	Township	Range	Section
	Ouchita	Monroe North 15	18N	4E	9

Waste Facility:	EPA I.D. No.
Gen. Motors Corp.	LAD067033944
Hearold Disposal Co.	LAD980501555

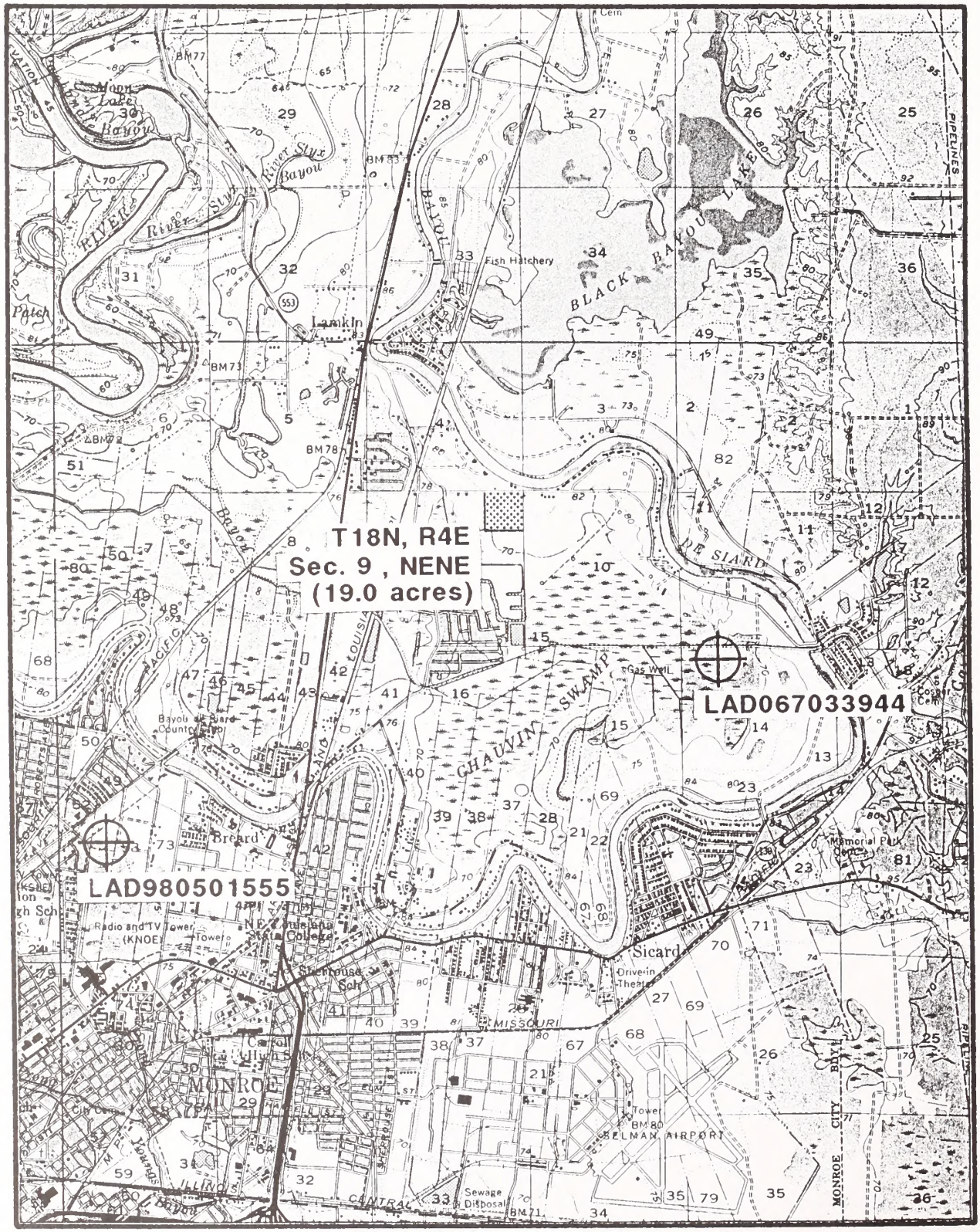


Figure 24

TABLE 15
Hazardous Wastes Sites Within 2 Miles
of BLM Lands in Louisiana

State	Parish	EPA I.D. Number	Facility Name	Latitude	Longitude
Louisiana					
	Caddo	LAD008052334	Atlas Processing Co.	322742.0	934720.0
	Caddo	LAD00225839	Electrotechnics Corp.	322812.0	934800.0
	Caddo	LAD08051005	Universal Oil Products	323230.0	934630.0
	Caddo	LAD980749881	Crow Property	323024.0	934454.0
	Ascension	LAD980879449	Dutchtown Reclamation Facility	301700.0	905800.0
	Ouachita	LAD067033944	Gen. Motors Corp.	323324.0	920218.0
	Ouachita	LAD0980501555	Hearold Disposal Co.	323206.0	920624.0

Chapter IV
Environmental Consequences

A. Introduction

This chapter analyzes the environmental consequences of implementing the alternatives presented in Chapter II. The alternatives are descriptions of management emphasis and primarily direct future site-specific and activity-specific decision-making by the BLM in the State of Louisiana.

The environmental consequences of the alternatives are often identified in general terms. Impacts under each resource are compared by alternative to emphasize the differences among alternatives. Table 16 gives the comparison of impacts of management alternatives by resource and decision type. Alternative a contains a discussion of the development anticipated in the reasonable forseeable future under current management. It also discusses the typical impacts of oil and gas development. Reasonable forseeable development and "typical" impacts, change under each alternative. Te relative differences are discussed but may not be quantified.

Where specific impacts have been developed, those estimates are based upon known data, including land ownership and FMO information. All impacts are assessed only where there is a known Federal interest, even though resource value zones contain private lands.

Because impacts were, of necessity, based upon only known information, the actual observed impacts may vary as the plan is implemented. As the land records are further analyzed, title conflicts will be resolved and other lands will be discovered that are part of the Federal estate. It is assumed for this plan that the eventual resolution of title conflicts and the discovery of "new" lands will be evenly distributed throughout the State. Therefore, the relative impacts of the alternatives would remain the same and planning decisions would continue to be valid for all Federal interests including the newly discovered tracts.

B. Alternatives

Alternative A (No Action or Continuation of Current Management Alternative)

The no action alternative represents the continuation of current management. Any new proposals would have to be consistent with current levels. Generally, project proposals (i.e. mineral lease actions, mineral development or lands transfer) would be considered through an environmental assessment (EA) on a case-by-case basis. Uses or actions are not developed or permitted according to any plan, allowing little consideration of cumulative impacts or other potential uses of the same land. Oil and gas leasing would continue under the Regional Oil and Gas EA for the southeast. The Bureau would continue to process applications for permit to drill. Public domain lands would remain under BLM jurisdiction; however, the agency would continue to respond to color of title or Recreation and Public Purposes Act (R&PP) applications, or nominations for sale of public land. Management would be characterized as reactive.

Table No. 16
Alternative Impact Comparison

This Chart is a comparison of impacts to each resource element and program considered in the Louisiana Planning Analysis relative to each alternative. The following key is used to represent the degree and type of impact:

Significant-Positive ++, Not Significant-Positive +, No Impact 0
Not Significant-Negitive -, Significant-Negitive --, Not Addressed-NA

Issue Related Elements	Impacts to Resource Alternatives			Impacts to Program Alternatives		
	A	B	C	A	B	C
1. Wildlife Habitat						
a. Oil and Gas Leasing	0	0/-	0	0/-	-	-
b. Oil and Gas Operations	0	0/+	0/+	-	-	-
c. Land Tenure	0	+	0/+	0/-	-	-
2. Wetlands/Floodplains/ Riparian/Coastal Zone						
a. Oil and Gas Leasing	0/-	0	0	NA	-	-
b. Oil and Gas Operations	0/-	0	0	-	-	-
c. Land Tenure	0/-	+	0	-	0	-
3. Water Resources						
a. Oil and Gas Leasing	0/-	0	0	0	-	-
b. Oil and Gas Operations	0/-	0	0	-	-	-
c. Land Tenure	0/-	0/+	0	NA	0	0
4. Geologic Hazards						
a. Oil and Gas Leasing	0	0	0	NA	NA	NA
b. Oil and Gas Operations	0	0	0	+	+	+
c. Land Tenure	0	0	0	NA	NA	NA
5. Soils						
a. Oil and Gas Leasing	0/-	0	0	NA	NA	NA
b. Oil and Gas Operations	0/-	0	0	+	-	-
c. Land Tenure	0/-	0	0	0	0	0
6. ACEC						
a. Oil and Gas Leasing	0	0	0	0	0	0
b. Oil and Gas Operations	0	0	0	0	0	0
c. Land Tenure	0	0	0	0	0	0
Non-Issue Related Elements						
1. Paleontologic Resources						
a. Oil and Gas Leasing	0/-	0/-	0/-	0	0	0
b. Oil and Gas Operations	0/-	0/-	0/-	0	0	0
c. Land Tenure	0/-	0/-	0/-	0	0	0

	Impacts to Resource Alternatives			Impacts to Program Alternatives		
	A	B	C	A	B	C
2. Wild and Scenic Rivers						
a. Oil and Gas Leasing	0	0	0	-	-	-
b. Oil and Gas Operations	0	0	0	0	0	0
c. Land Tenure	0	0	0	NA	NA	NA
3. Air Quality						
a. Oil and Gas Leasing	0/-	0/-	0/-	NA	NA	NA
b. Oil and Gas Operations	0/-	0/-	0/-	-	-	-
c. Land Tenure	0/-	0/-	0/-	NA	NA	NA
4. Vegetation						
a. Oil and Gas Leasing	-	0/-	0/-	NA	-	-
b. Oil and Gas Operations	0/-	0/-	0/-	-	-	-
c. Land Tenure	0	0	0	NA	0	-
5. Cultural Resources						
a. Oil and Gas Leasing	0/-	0	0	-	-	-
b. Oil and Gas Operations	0/-	0	0	-	-	-
c. Land Tenure	0/-	0	0	-	-	-
6. Visual Resources						
a. Oil and Gas Leasing	0/-	0	0	NA	NA	NA
b. Oil and Gas Operations	0/-	0	0	-	-	-
c. Land Tenure	0/-	0	0	0	0	0
7. Wilderness						
a. Oil and Gas Leasing	0	0	0	-	-	-
b. Oil and Gas Operations	0	0	0	NA	NA	NA
c. Land Tenure	0	0	0	0	0	0
8. Socio-Economics						
a. Oil and Gas Leasing	++	+	+	++	+	+
b. Oil and Gas Operations	++	+	+	++	+	+
c. Land Tenure	0	0	0	0	0	0
9. Recreation						
a. Oil and Gas Leasing	0/-	0	0	NA	-	-
b. Oil and Gas Operations	0/-	0	0	-	-	-
c. Land Tenure	+	++	+	+	+	+
10. Transportation						
a. Oil and Gas Leasing	0	0	0	NA	NA	NA
b. Oil and Gas Operations	+/-	+/-	+/-	-	-	-
c. Land Tenure	0	0	0	0	0	0
11. Hazardous Waste						
a. Oil and Gas Leasing	0/-	0/-	0/-	NA	0/+	0/+
b. Oil and Gas Operations	0/-	0/-	0/-	NA	0/+	0/+
c. Land Tenure	0/-	0/-	0/-	+	+	+

This is a limited protection alternative since very little is considered beyond legislative or regulatory requirements.

In order to project the potential acreage to be disturbed in the reasonable forseeable future under this alternative as a result of BLM mineral leasing and development decisions, it is necessary to look at past activity. BLM mineral activities in the State are primarily related to oil and gas, although there is potential for lignite, sulfur and sodium development. As of September 30, 1986, there were 719 Federal oil and gas leases covering approximately 334,000 acres. Of these figures, 63 new leases covering about 17,000 acres were issued during FY 86. These figures were down from the FY 85 figures of 78 leases totaling 43,736 acres.

The number of leases issued has very little impact or bearing on the number of wells drilled or the amount of production. The number of applications for permit to drill (APD) and the number of active leases (i.e., producing or participating in production) give a more exact indication of the existing level of activity resulting from BLM's past and present actions.

The Jackson District Office processed 42 APD's in 12 different parishes during 1983, 12 APD's in 4 parishes in 1984, 19 APD's in 6 parishes in 1985, and 6 APD's in 3 parishes in 1986.

The parishes with the most Federal-related activity were DeSoto wth 15 APD's, Webster and Caddo with 14, Bossier with 8 and Claiborne with 7. The other parishes with APDs were Natchitoches, Caldwell, Union, Grant, Winn, St. Marys, and St. Martin.

A review of several sources yielded a figure for the typical acreage impacted by oil and gas development of 1/2 to 1 1/2 acres for a gas well and 1 to 3 acres for an oil well. For the purposes of this discussion, an average figure of 1 1/2 acres disturbed per well (oil or gas) is used. With the number of APD's shown above, the annual acreage disturbed over the past four years has been 9 acres in 1986, 28 1/2 acres in 1985, 18 acres in 1984 and 63 acres in 1983.

This yields a total of almost 120 acres disturbed by Federal oil and gas development since the opening of the Jackson District Office. Impacts by parish for the same period would be a follows: DeSoto, 22.5 acres; Webster and Caddo, 21 acres; Bossier, 12 acres; Claiborne, 10.5 acres; Union, 6 acres; Natchitoches, Caldwell, Grant and Winn, 3 acres; and St. Mary's and St. Martin, 1.5 acres. These figures for total acres disturbed by year and for acres disturbed by parish as a result of Federal action are insignificant when compared with private activity or development.

In summary, the Jackson District Office has processed an average of 20 APD's per year in Louisiana since the office opened in 1983. Assuming a similar level of activity for the planning horizon (10 years) would yield approximately 300 acres disturbed. This is less than one percent of the total Federal acreage presently under lease in the State. This is not considered a "significant impact on the human environment." There is potential for sulfur, sodium and lignite leasing and development. Impacts of these actions will be determined when applications are received.

The actions by BLM will not, by themselves, impact the economy or infrastructure of the State of Louisiana. Decisions regarding the disposition of the remaining P.D. land will have no impact. Minerals decisions will only have significance as they contribute to the impacts caused by mineral market fluctuations and decisions in the private sector. The anticipated resource-specific impacts for this alternative are discussed below.

1. Mineral Resources

1A. Mineral Development

a. Impacts

The primary impact on minerals is the degree of availability of land for mineral development. Impacts affecting mineral resources under the Alternative A result from surface managing agency (SMA) plans and decisions, areas restricted or regulated by law (i.e., Wilderness areas, national parks, wildlife refuges, etc.), and resources protected or regulated by law (i.e., Federally-listed threatened and endangered species, cultural resources, wetlands, etc.).

The decisions of the individual SMA's determine in which areas the minerals will be available for leasing and development under Alternative A. The U.S. Forest Service has specified in the Kisatchie Forest Land Management Plan that certain areas will only be open with no surface occupancy or with special stipulations. They also identified areas open with standard, Forest-wide stipulations. As discussed in Chapter II, leasing is not permitted on national wildlife refuges except where there is drainage from oil and gas operations outside the refuge boundary. National Parks are closed to mineral development by law. No leasing of any kind, including for drainage, will be permitted.

The management common to all alternatives discussions in Chapter II outlines the procedures followed in leasing, permitting and inspecting Federal oil and gas. Legislation--or regulation-mandated resource protection processes are included for paleontologic resources, threatened and/or endangered species, cultural resources, visual resources, Wilderness areas, and areas of critical environmental concern. Application of these procedures on a case-by-case basis at lease or permit application stages will yield areas where mineral development is not allowed or where it is allowed with restrictions. (See Mitigation Measures discussion.) Thus, these mandated procedures may result in delay or loss of production, the extent of which can not be measured since they will be applied case-by-case.

b. Mitigation Measures

Under the Current Management Alternative, mitigation for oil and gas activities would essentially be the standard stipulations on the lease forms supplemented by consent-related stipulations of SMA's and stipulations

required as a result of mandated protection described in the sections above. Mitigation would be case-by-case and site-by-site. Stipulations placed in the lease document are followed at APD stage to mitigate environmental impacts or protect the use for which the SMA's withdrew or acquired the lands affected. Typically, the stipulations relate to threatened or endangered species, cultural resources, wetlands and areas with potential for H_2S.

c. Residual Impacts

Oil and gas resources leased and developed during the life of the plan would not be available for future generations.

d. Relationship Between Short-Term Use and Long-Term Productivity

Where mineral development takes place, the benefits occur exclusively in the short term. No leasing or withdrawal from mineral development requirements would create long-term adverse effects on mineral development.

e. Irreversible or Irretrievable Commitments of Resources

The oil and gas extracted and used, and that which is unrecoverable due to technological constraints, would be irretrievably lost (unless technological advances are made making remaining resources recoverable).

1B. Geologic Hazards

a. Impacts

Two known geologic hazards which affect oil and gas development occur in the State of Louisiana--high pressure zones and areas with known hydrogen sulfide gas (H_2S). Figure 25 delineates these areas. Sometimes, there are abnormally high pressures in reservoirs associated with salt dome structures. Wells being drilled for oil and gas may unexpectedly penetrate the high pressure zones and potentially could "blow out". The "blow out" could be injurious to oil/gas field workers. The "blow out" could also cause oil, gas and/or saltwater to penetrate nearby water wells. Because of the development of "blow out" preventers, the probability of occurrance is reduced; however, as recently as October 1986, there was a "blow out" in Jefferson Davis Parish.

The second geologic hazard, H_2S, is a deadly gas associated with certain geologic zones where oil and gas resources are found. If not properly mitigated, mineral development in H_2S zones could cause extreme health and safety hazards.

b. Mitigating Measures

High pressure is mitigated through good mud programs, adequate casing strings and blowout preventers. The H_2S hazard is mitigated by BLM through stipulations in an Environmental Assessment prior to development requiring that the operator have a H_2S monitoring plan. This plan outlines the safety procedures to be followed during drilling and production to minimize potential for accidental injury or death.

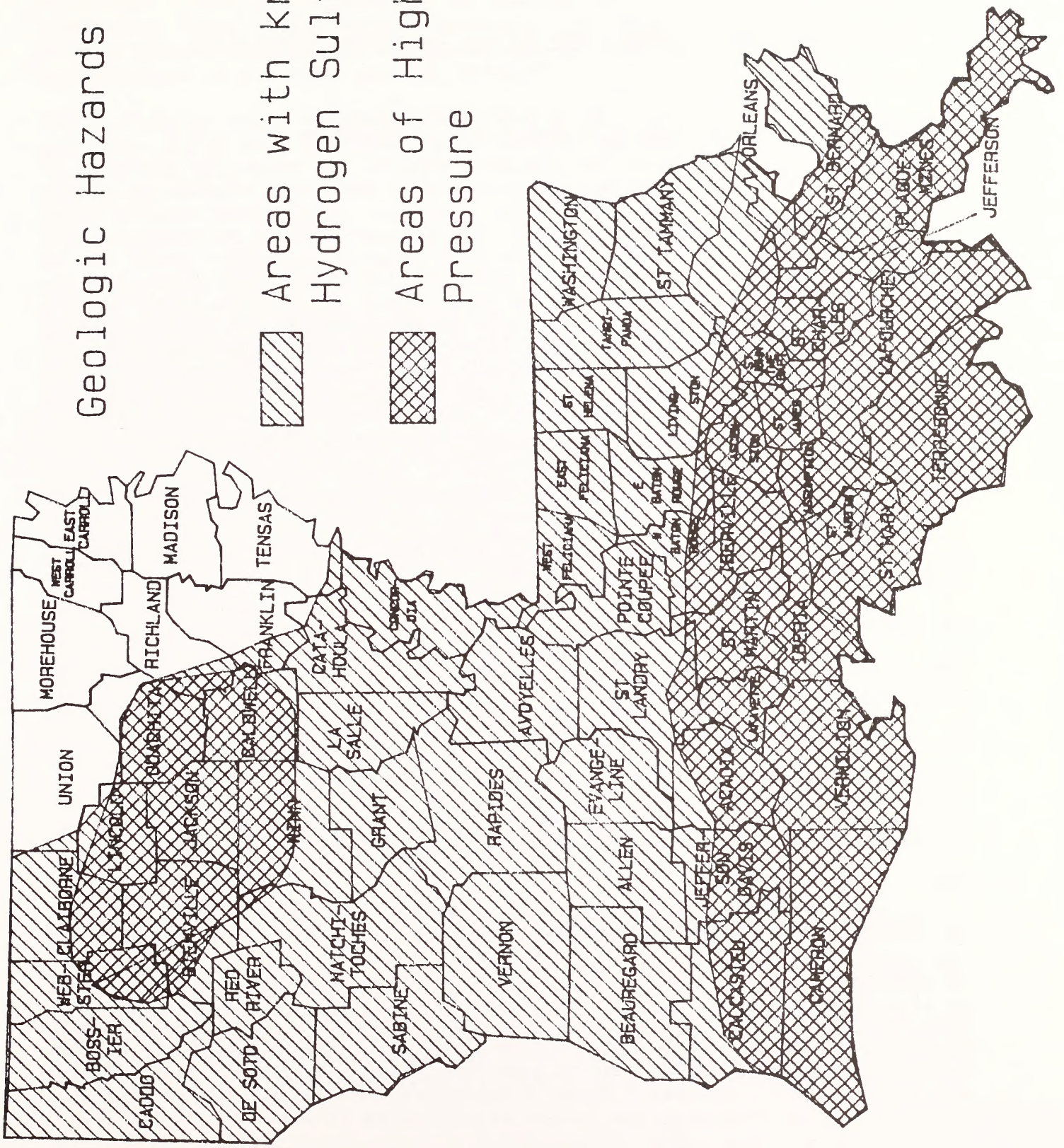

Geologic Hazards
Areas with known Hydrogen Sulfide
Areas of High Pressure
MOREHOUSE
WEST CARROLL
EAST CARROLL
MADISON
TENSAS
RICHLAND
FRANKLIN
CATAHOULA
CONCORDIA
UNION
OUACHITA
LA SALLE
WEBSTER
BOSSIER
LINCOLN
JACKSON
WINN
GRANT
RAPIDES
AVOYELLES
POINTE COUPEE
WEST FELICIANA
EAST FELICIANA
ST HELENA
WASHINGTON
ST TAMMANY
TANGIPAHOA
LIVINGSTON
E. BATON ROUGE
ORLEANS
ST BERNARD
PLAQUEMINES
JEFFERSON
ST CHARLES
ST JAMES
ST JOHN
ST MARTIN
IBERIA
ST LANDRY
EVANGELINE
ACADIA
VERMILION
IBERVILLE
CADDO
DE SOTO
RED RIVER
NATCHITOCHES
SABINE
VERNON
ALLEN
BEAUREGARD
JEFFERSON DAVIS
CALCASIEU
CAMERON

Figure 25

c. Residual Impacts

None

d. Relationship Between Short-Term Use and Long-Term Productivity

Not Applicable

e. Irreversible or Irretrievable Commitment of Resources

None

2. Paleontologic Resources

a. Impacts

As stated under the management common to all alternatives section in Chapter II, paleontologic resources on split estate lands were transferred with the surface, unless specifically referenced in the mineral patent reservation (no such reservations are known to exist in Louisiana). Further, it is stated in Chapter III that there are no currently known paleontologic sites located on or in proximity to BLM-administered surface tracts. Therefore, there is no anticipated impact to paleontologic resources.

b. Mitigating Measures

The BLM mitigation procedures for paleontologic resources are outlined in Chapter II.

c. Residual Impacts

The potential exists that unknown paleontologic resources may be damaged by BLM approved mineral operations.

d. Relationship Between Short-Term Use and Long-Term Productivity

Not Applicable.

e. Irreversible or Irretrievable Commitments of Resources

None

3. Wildlife and Threatened & Endangered Species

a. Impacts

Oil and gas activities have impacted wildlife habitat principally through displacement of animals and habitat destruction. The quantity of habitat disturbed has been low, but impacts have been dispersed over a widespread area due to roads and pipelines. Human encroachment associated with exploration, development, and production has caused wildlife such as white-tailed deer and

turkey to avoid areas of disturbance in upland areas and waterfowl to avoid such areas in coastal wetlands. These impacts tend to be transitory, with major disturbances only occuring during the actual construction and drilling operations. Positive impacts may be realized by creating varied habitat and additional "edge" areas around openings. To date, on actions related to Federal Mineral Ownership in Louisiana, oil and gas operations account for the most acreages of adversely modified habitat.

The Mississippi delta wetlands are at the southern extreme of the major duck and goose migration corridors. Winter-habitat quality for migratory waterfowl is extremely important for nesting success. Two major migration corridors to gulf coast marshes are located in east Texas and Louisiana, where 3-9 million ducks migrate every year (Bellrose, 1980). Responsibility for preservation and management of existing populations of migratory birds using the air spaces of the United States is assumed by the United States under the provisions of the Migratory Bird Treaty Act of 1918 with Canada and Mexico. The United States' responsibility is administered by the U.S. Fish and Wildlife Service in cooperation with the affected States. Impacts have occurred throughout the planning area with the greatest intensity in areas with Known Geologic Structures and producing oil and gas fields. Surface disturbance would reduce foraging cover and nesting habitat until the site is successfully reclaimed.

Red-cockaded woodpeckers have been impacted throughout the State by loss of habitat on private and public lands. The loss of old growth pine stands through timber harvesting and other development projects has severely limited suitable habitat, and therefore impacted population levels of the woodpecker. Colonies may currently be found on both private and Federal lands; however, timber company lands tend to have younger timber stands than are required by the red-cockaded woodpecker. Habitat loss on private lands will not only negatively affect woodpecker populations on private lands, but also the existing populations on Federal lands, because of habitat fragmentation and population isolation (Lennartz, McClure, Rudis, 1983.) Impacts to red-cockaded woodpeckers also occur from human disturbance in colony areas. Mechanical noises and associated human activity during the nesting season (April-June) can cause nesting failure (Jackson, 1983). While the impact of individual small-acreage leases may be insignificant, the cumulative effects of all oil and gas development as well as major land use changes may preclude the recovery of the species. As noted before, the impact of BLM approved projects is very small and should be viewed as insignificant. Also, Federal leasing itself has no impact and development will include mitigation measures to preclude impacts.

Impacts to bald eagles have occurred throughout Louisiana. Human activities, both short-term and long-term, and alteration of habitat may affect the reproductive success of nesting bald eagles. Impacts of short-term disturbance is largely dependent upon the nature of the activity, its time of occurrence in the nesting cycle and the past exposure of the nesting pair to similar activities. In Louisiana, the nesting period of most bald eagle pairs will fall between October 1 and May 15. Disturbance during this critical period may lead to nest abandonment, cracked and chilled eggs, and exposure of nestlings to the elements.

The ringed sawback turtle (found in the Pearl and Bogue Chitto River systems) has been impacted by decimation of nesting and sunning habitat primarily through flood control projects and channel modification. Any Federal mineral

actions in the vicinity of these watersheds (and there are 90 acres of FMO in the area) which affects water quality or turtle habitat could have an impact on this species.

The brown pelican has been impacted throughout its range. Reduced abundance has resulted primarily from impairment of reproduction functions caused by ingestion of pesticides (primarily DDT, polychlorinated biphenyls, diendrin and endrin). Other detrimental factors include human disturbance of nesting sites, and physical damage to the birds as a result of getting caught on fish hooks and being strangled by monofilament fishing line.

The Louisiana pearlshell mussel is found only in Rapides Parish, in the Bayou Beouf drainage. This mussel's decline has been attributed to loss of habitat through impoundment, and habitat degradation through increased siltation and pollution. The majority of known habitat for this mussel is on the Kisatchie National Forest, Evangaline Ranger District. A significant acreage of FMO could be subject to protective stipulations (an estimated 15 - 20,000 acres).

The gopher tortoise is found in Washington and St. Tammany Parishes, as isolated individuals. There are no known breeding populations (colonies) in existance in Louisiana. Gopher tortoise decline has been attributed to habitat destruction or modification (converting open, xeric longleaf pine stands to heavily planted loblolly or slash pine), and direct loss through harvesting and impact with machinery. There are approcimately 120 acres of FMO within the range of the tortoise where protective stipulations may be necessary.

BLM activities other than oil and gas leasing could impact wildlife . Divestiture of public domain lands administered by the BLM could impact wildlife by allowing lands previously used primarily for wildlife habitat to be allocated to other purposes. Other activities such as mining coal, lignite, etc. could impact wildlife.

b. Mitigating Measures

The following laws and regulations provide the basic authority to apply protective requirements for fish and wildlife, as well as other resources, to oil and gas activities conducted on public domain and acquired land oil and gas leaseholds.

Laws:

(1) The Mineral Leasing Act of 1920 as amended and supplemented (30 USC 181 et seq.).
(2) The Mineral Leasing Act for Acquired Lands of August 7, 1947, as amended (30 USC 35-359).
(3) The Migratory Bird Treaty Act of 1918.
(4) The Refuge Administration Act of 1966 (16 USC 668dd-ee).
(5) The National Environmental Policy Act of 1969 (42 USC 4321 et seq.).
(6) Federal Land Policy and Management Act of 1976 (43 USC 1901).
(7) Endangered Species Act of 1973 (as amended 1982)

Regulations:

(1) 43 CFR 3000 - Minerals Management
(2) 43 CFR Part 3045 - Geophysical Exploration (Oil and Gas)
(3) 43 CFR Part 3100 - Oil and Gas Leasing
(4) 43 CFR Part 3160 - Onshore Oil and Gas Operations
(5) Onshore Oil and Gas Order No. 1 (Approved of Operations on Onshore Federal & Indian Oil & Gas leases) issued under 43 CFR 3164, 48 F.R. 48916 and 48 F.R. 56226.
(6) Onshore Federal and Indian Oil and Gas Leases) issued under 43 CFR 3164, 48 F.R. 48916 and 48 F.R. 56226.

The Bureau of Land Management (BLM) complies with these laws in its issuance of oil and gas leases and during lease administration. Requirements for lessees/operators related to these laws are included in the standard lease terms and may be more specifically applied as special stipulations. Additional requirements may also be imposed as conditions of approval for operations conducted on the leasehold (i.e., approval of Applications for Permit to Drill, Sundry Notices, etc.).

During the review process of any BLM permitted or licensed activity, informal consultation is made with the US Fish and Wildlife Service (USFWS), Louisiana Natural Heritage Program, and the surface managing agency biologist (as appropriate) to determine if any threatened, endangered, or candidate species may be present on the site. Should there appear to be any T&E species inhabiting the area, an on site inventory and review will be done. In the event that T&E species are shown to inhabit the area, further consultation with the USFWS is carried out, and any mitigating measures deemed necessary to avoid placing the species in "jeopardy" will be incorporated.

Impacts to redcockaded woodpeckers will be evaluated in light of recent USFWS guidance. This guidance states that anytime there is a surface disturbing activity within one half mile of an active colony site, that the activity will be evaluated to insure that 1) no direct impacts to cavity trees will be encountered, and 2) that there will be at least 125 acres of foraging habitat (pine stands greater than 30 years old) per colony within one half mile of the colony. Surface disturbance should be restricted within a 200' buffer zone surrounding an active colony.

Mitigation in areas inhabited by the Louisiana pearlshell mussel will be water quality protection. All oil and gas operations which could impact water quality within the mussel's range will be designed to minimize impacts to water quality.

Protective stipulations for the gopher tortoise would prohibit the destruction of active tortoise burrows. Additionally, a 10 meter buffer zone of no surface occupancy surrounding an individual burrow would be required. Protective stipulations for active colonies are currently being developed by the USFWS and will be incorporated as soon as they are finalized.

Primary mitigating measures to protect the ringed sawback turtle will be to ensure that water quality is not impacted, and that nesting and sunning sites are not disturbed.

The following U.S. Fish and Wildife Service protective guidelines will be included in all leases and permits occurring in areas identified as having eagle nests. Such guidelines will be considered conditions of approval of any applications for permit to drill submitted after lease issuance.

A. Primary Zone: This is the most critical area immediately around the nest, and must be maintained to promote optimum conditions for eagles.

1. Size: Except under unusual circumstances (e.g., where a particular pair of bald eagles is known to be tolerant of closer human activity), the boundary of the primary zone should not be less than a 750-1,500 feet radius from the nest tree, depending upon site specific requirements.

2. Recommended Restrictions: No activity in the primary zone at any time.

B. Secondary (Buffer) Zone: The purpose of this zone is to minimize disturbance that might weaken the integrity of the primary zone, protect important areas outside of he primary zones, and encompass lands that provide suitable habitat in the future.

1. Size: It should lie outside the primary zone and have a minimum circular radius of 750'-1 mile, depending upon site-specific purposes .

2.Recommended Restrictions:

(1) Limit the building of new roads, modification of access roads and canal improvements facilitating access to the nest.

(2) No major activities should occur in this zone during the nesting period October 1 through May 15. Examples are logging, seismographic activities employing explosives, oil well drilling, and low altitude reconnaissance flights (100 to 500 feet).

Mitigating measures to protect the brown pelican will be to require a seasonal no surface occupancy (NSO) stipulation on small islands (NSO from April 1 - August 30), and a 1,500' NSO buffer zone on mainland and larger island sites. In addition, nesting habitat (i.e. trees and shrubs where nests are constructed) will be protected from destruction. A known nesting site under BLM jurisdiction, Queen Bess Island, would be subject to such stipulations.

c. Residual Impacts

In areas where oil and gas production facilities are in place for long periods of time, there may be residual impacts to resident wildlife populations. Loss of habitat and displacement of wildlife populations from previously frequented areas may have residual impacts on some species.

d. Relationship Between Short-term Use and Long-term Productivity

In the short-term, wildlife may be displaced from previously frequented areas

where mineral development takes place. During development and production activities, occupied production sites would be unavailable for use by wildlife. In the long term, after restoration procedures in areas affected by mineral activities are complete, productivity should not be significantly affected. In some situations, long term productivity may be enhanced byminerals operations. This could occur when mineral development sites are restored to a condition more favorable to wildlife production than were the original conditions.

e. Irretrievable or Irreversible Commitment of Resources

There should be no irretrievable or irreversible commitment of resources under this alternative.

4. Water Resources

a. Impacts

Bureau of Land Management activities which may potentially affect water resources are restricted to onshore Federal oil and gas leasing, public land disposal, and possible future lignite extraction in DeSoto and Sabine Parishes. Water-quality issues which could affect future ground water use in parishes having public land or Federal mineral ownership are shown in Figure 11.

Oil and Gas Operations

Public and private water rights must be preserved and protected from degradation of water quality and quantity caused by impacts related to energy and mineral development. Most of the impacts to water resources under current management are from fluid mineral development.

Improper well completion or trenching practices could cause contamination of artesian aquifers. Because of the predominance of oil and gas production in certain parishes in the State, there is a large need to dispose of waste saltwater. This fact accounts for the large number of Class II wells in Louisiana, most of which are directly associated with saltwater disposal (See Figure 26). Here the potential may be high for encountering brackish or saline groundwater which would normally be absent in the aquifers. Besides the disposal of oil and gas exploration and production waste products, some wells themselves may pose a potential threat to Underground Sources of Drinking Water (USDW) due to inadequate well construction or completion. The production and discharge of formation waters (oil field brines) may contribute to water quality degradation if released into surface water. Produced formation waters may contain toxic substances, heavy metals, dissolved hydrocarbons and inorganic salts. The heavy metals may include cadmium, chromium, copper, lead, mercury, nickel and zinc, although usually present in trace quantities. The constituents of these brines may vary from formation to formation within a single formation. Chronic, low-level oilspills have resulted in fairly high levels of hydrocarbons in marsh sediments in the Leeville oil field (Bishop, 1976).

In addition to production and disposal wells, the existence of more than 120,000 surface impoundments related to oil and gas activities, over the past 80 years, may have had water quality impact potential. The cumulative impact

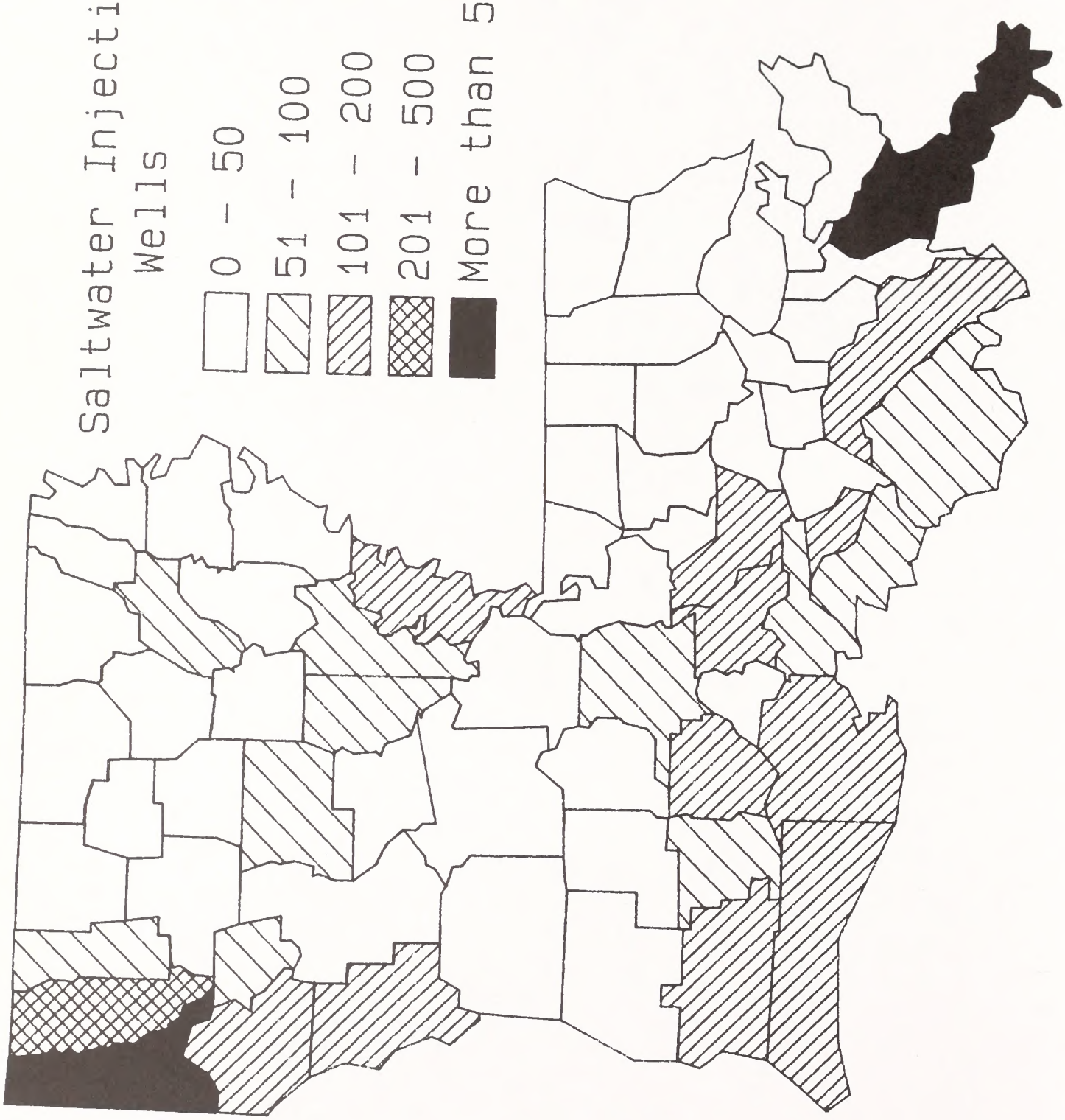

Saltwater Injection Wells
0 - 50
51 - 100
101 - 200
201 - 500
More than 500

Figure 26

of these impoundments through time is essentially unknown. (Louisiana Geological Survey, 1980). Some investigations have correlated high chloride concentrations in shallow terrace and alluvial aquifers to some contamination by leaking saltwater "evaporation pits" and other well activities. (Louisiana Dept. of Public Works, 1975; Snider, 1981; Whitfield, 1980).

An estimated 376,000 barrels per day of crude oil is being produced (1985) from onshore Federal leases in the State. Oil and gas development occurs throughout the planning area, but is generally concentrated in northwest and southeast Louisiana. Exploration and development of oil and gas wells could have impacts on nearby water sources. However, if any wells encounter water-bearing zones, these wells could provide new sources of water. Water required for each well drilled is highly variable, depending on hole size, type of drilling mud, and water encountered downhole.

If there are no fresh-water bodies in the immediate area of the initial drill site, water is usually obtained by drilling a shallow well near the drill site. During oil and gas drilling, water requirements on a daily basis would be those amounts necessary to maintain the drilling fluid system. This volume will likely approach the national average for water use per foot per day. The national average of water used per foot per well drilled was 1.62 barrels (68 gallons) while the lowest quantity used was 0.27 barrels (11.3 gallons). This figure can be used to calculate potential water use at the application stage on a well-by-well basis.

Oil and gas operations may produce impacts on the subsurface environment with respect to ground water quality. Impacts can occur during all phases of oil and gas operations from preliminary investigations through abandonment. The main source of impact during the preliminary investigation phase will be shot holes drilling during geophysical surveys. Improperly plugged holes could cause contamination of shallow aquifers and ground water could be lost to the surface if shallow artesian systems are penetrated.

During the exploration phase, the drilling of a stratigraphic test or wildcat well produces a conduit whereby groundwater could be lost either by migration to lower formations or by flow to the surface. Fresh water aquifers could also be impacted by an upward flow of saline waters, oil or gas, or a downward flow of deleterious surface materials through improperly constructed conduits.

During the development phase, ground water impacts would be the same as described for drilling and exploratory well completion. The probability of impact would increase in proportion to the number of wells drilled. The discharge of produced water or other nonhazardous oilfield water (NOW) into manmade or natural drainage or directly into State waters is allowed only in conformance with any applicable State or Federal discharge regulatory program. Contamination of a groundwater aquifer or a Underground Source of Drinking Water (USDW) with NOW is strictly prohibited. In addition, the injection of NOW into a groundwater aquifer is strictly prohibited. (Amendment to Statewide Order No. 29-B, Jan. 20, 1986). Amendments concerning the storage, treatment, and disposal of nonhazardous oilfield waste, NOW storage pits, and reuse of processed NOW may set a threshold to restrict oil and gas development in Louisiana.

Oil and gas development occurs throughout the entire planning area. Although the areal extent of each oil or gas pad or site is quite small in acreage, cumulative effects of all sites with respect to erosion, sediment

transport, excavation and road building can present a significant impact to receiving waters. Sensitive watersheds may need to be identified under watershed management plans to protect these areas and to ensure minimal impacts from oil and gas roads, pads and flowlines. Products from oil and gas drilling operations (drill muds, fluids, spills and surface runoff) eventually enter groundwater and stream systems and add to the overall reduction of water quality from energy and mineral development. In addition, improper drilling, completion, or abandonment of oil and gas wells could degrade the water quality of nearby springs and could impact the quality of the groundwater systems by mixing of aquifer waters.

Oil production is usually accompanied, particularly in the later stages of production, by relatively large volumes of brine in the Gulf coastal plain of Louisiana. Disposal must be accomplished through underground injection methods since precipitation is too great for surface evaporation methods of water disposal to be used. The potential for degradation of fresh water in ground water systems is a function of both volume of produced water and salinity. As the volume and/or salinity increases, so does the potential for degradation. In cases where brines are not reinjected into source formations or into other petroleum producing formations, they are normally disposed of by injection into salt water bearing formations containing waters of similar or poorer quality. This will result in no impact to water quality in the disposal zone. However, if brine disposal creates sufficient pressure gradients in improperly abandoned wells or inadequately cemented casings of producing wells, saline waters could be forced upwards through natural fractures in the ground water system.

One area of the State where future oil and gas development may need to be restricted or stipulated is in Southwest Louisiana. A citizen's group has petitioned EPA to designate the Chicot aquifer system is a sole or principal source of drinking water under Section 1424 of Public Law 93-523, the Safe Drinking Water Act. Oil and gas development was cited in the application as a contributing factor in the contamination of the aquifer system. Sole source designation would probably bring with it requirements for special stipulations at the APD stage for Federal mineral development in the 15 parish area, in the southwest corner of the State.

Saltwater Intrusion and Encroachment

Saltwater intrusion and encroachment are localized problems in Louisiana. Saltwater encroachment, defined as the introduction or accumulation of saline water into groundwater of lesser salinity, occurs over a long period of time. Intrusion is considered to be the introduction of saline water in a surface stream of lesser salinity and is a more frequent, short-term water resource problem than encroachment.

Resources Development-Lignite Mining

Land-use issues such as lignite mining in DeSoto and Red River Parishes. In these parishes, the lignite supply is estimated at 600 million tons, with potential equivalent to 8.97 trillion cubic feet of gas (Bureau of Mines, 1979). Mining of these resources may alter surface drainage patterns and groundwater flow in the Red River and Wilcox aquifers, and may cause sedimentation and water quality degradation. Mining could cause increased concentrations of dissolved solids, sediment load, and other surface water

constituents. Concentrations of iron and manganese are high in groundwater in most of the area and could adversely effect water quality in receiving streams unless effluent standards of the Louisiana Surface Mining and Reclamation Act are met through sediment pond treatment of mine runoff. Presently, there are no Federal lignite reserves under lease application in Louisiana.

Other mineral resources, such as sulfur and salt, are developed and produced in Louisiana. However, none of these other minerals are being developed and produced in the same areas as upland petroleum operation on Federal lands or KGS areas.

b. Mitigating Measures

Committed mitigation to protect both surface and groundwater is provided by Federal and State laws and regulations. Standard Bureau regulations as described in Onshore Oil and Gas Order No. 1 issued under 43 CFR 3164 are the primary source of mitigating measures.

Five different State agencies have active roles in administering ground-water activities in Louisiana. The Department of Transportation and Development's Office of Public Works (OPW) licenses and regulates drillers of water wells, monitor wells, geotechnical bore holes, and heat pump wells, as well as those engaged in plugging abandoned wells and bore holes. The OPW registers all water wells drilled in Louisiana and maintains an active computer file of these wells. The OPW also administers the Louisiana Water Resources Information Center, which has the responsibililty of indexing all available water-resources information for the State. The Department is the major State agency participating with the U.S. Geological Survey in a cooperative ground-water program of data collection, areal studies, and research.

The Department of Natural Resources has certain regulatory responsibilities relating to protection of ground water. The Department's Office of Conservation has jurisdiction over underground injection wells and also has regulatory functions relating to protection of ground water in areas of lignite mining and oil and gas development. The Louisiana Geological Survey maintains some ground-water functions, principally in support of the missions of the Department of Natural Resources and other State agencies.

The Louisiana Department of Health and Human Resources has responsibility for ensuring that drinking-water supplies are safe and of good quality and also enforces construction standards for public-supply wells. The newly formed Department of Environmental Quality has responsibilities for monitoring and protecting ground water related to regulation of solid and hazardous waste. (National Water Summary, 1984, USGS.)

Further mitigation is provided by the following Federal laws and standards:

1. Federal Water Pollution Control Act of 1972 (PL 92-500);
2. Surface Mining Control and Reclamation Act (PL 95-87);
3. Resource Conservation and Recovery Act (PL 94-580), (RCRA);
4. Safe Drinking Water Act of 1977 as amended (PL 93-523);
5. Clean Water Act of 1977;
6. Federal Land Policy and Management Act of 1976 (FLPMA);
7. Water Resources Development Act;
8. Coastal Zone Management Act of 1972;
9. National Environmental Policy Act (NEPA); and
10. Comprehensive Environmental Response, Compensation and Liability Act of 1980 (PL 96-510), (CERCLA).

In addition, the State of Louisiana has adopted water quality standards and effluent limitations, including basic standards for both surface and groundwater, and site-specific standards. State laws have established a number of municipal and regional agencies with "special purpose" responsibilities for water resources. The Capital Area Groundwater Conservation District, founded in 1974 under Louisiana R. S. 38: 3072-76 is powered by statute to limit groundwater uses in East and West Baton Rouge, East and West Feliciana, and Pointe Coupee Parishes.

Any water discharged on the surface by any industry is controlled by the Louisiana Water Discharge Permit System (LWDPS) promulgated under authority of the Louisiana Environmental Quality Act (L.R.S. 30: 1051 et seq. 1983 as amended). The LWDPS permits are issued on a project-by-project basis, setting discharge limits for water quality parameters in an effort to maintain ambient water quality.

c. Residual Impacts

The possibility of a residual impact is considered minimal. The only anticipated cause of residual impacts would result from accidental spillage of salt water or oil spills. Even if operations are conducted in accordance with BLM guidelines and accepted practices, these impacts may occur. However, these guidelines and practices insure that the impacts will be addressed rapidly and effectively.

d. Relationship Between Short-Term Use and Long-Term Productivity

In the case of an accidental spill, short term impacts could occur. Such impacts may include fish kills and destruction of vegetation along stream banks. No long-term impacts are anticipated due to the required clean up activities by the operators, and the natural dilution of any spilled materials by rainwater, and by the natural dispersement of the spill as it travels downstream.

e. Irreversible or Irretrievable Commitment of Resources

No irreversible and/or irretrievable commitments of water resources are anticipated, based on the mitigating measures outlined in B above.

5. Floodplains, Wetlands and Coastal Zones

a. Impacts

The amount of oil and gas produced on Federal lands within floodplains and wetlands is relatively small, less than three (3) percent of the total acreage of Federal production wells are located within these zones. Of greatest significance are petroleum fields in the Louisiana Gulf Coastal Plain and Mississippi alluvial plain where some of the most productive onshore Federal oil and gas wells are located. Wetlands and coastal zone impacts continue to be related to both transportation and petroleum industries. Each year, more than 50 square miles of marshland is lost to coastal erosion, saltwater intrusion, canal dredging, subsidence, and lack of freshwater and natural siltation.

Floodplains may be affected by energy and mineral development in two ways: (1) by the direct physical modification of the floodplain proper, which would change the natural and beneficial water course network and flow, and (2) disruption of natural water flow to the receiving floodplains, which would modify the existing water quantity and quality.

Lands activities such as divestiture of public domain could have an impact on wetlands. However, it is BLM policy to attempt to tranfer title of wetland public domain lands to another surface managing agency such as U.S. Fish and Wildlife Service, State Fish and Wildlife departments, etc., which would minimize potential impacts.

b. Mitigating Measures

The EPA is presently looking at coastal wetland mitigation measures to be applied to oil and gas development. As these measures become formalized, they may be applied to future Federal mineral development in the coastal parishes.

A Coastal Use Permit (CUP) system has been established through the Louisiana State and Local Coastal Resource Management Act of 1978 (Act 361) to ensure management and reasonable use of the state's coastal wetlands. Permits are required when activities such as road building, canal dredging, facility construction, etc., takes place within the coastal zone.

Modifications and developments by the Bureau of Land Management within the 100-year floodplain in Louisiana will be mitigated so as to not impact natural beneficial functions of natural floodplains or create any hazards to life or property. All projects will be designed to include general preventive practices such as runoff control devices, proper road location and design, maintenance of vegetative cover, confinement of pollutants, and treatment of pollutants in order to minimize potential impacts. Oil and gas operations and land-use projects will be inspected to assure that compliance with floodplain restrictions are included when needed.

Any activity which involves earth-moving operations in a floodplain will require a "404" permit from the Army Corps of Engineers as directed by the Clean Water Act. Any mitigation required by the Corps as a part of the "404" permit will become an addendum to any BLM decision in these areas (such as issuance of a permit to drill).

Special mitigating measures which may be necessary to protect wetlands will be determined on a case-by-case basis. Special stipulations deemed necessary will be required as conditions of the permit.

All discretionary land tenure cases will be resolved in conformance with E.O. 11990 and E.O. 11998. Conservation easements, patent restrictions, etc. will be employed to protect the wetland character of these tracts.

c. Residual Impacts

Many oil reserves in Louisiana are concentrated around salt domes that occur across the coastal wetlands and on the continental shelf. The inland fields were developed first. An enormous expansion of petroleum demand began in the war years of 1941-45. This resulted in dredging thousands of miles of canals through the coastal wetlands for access to drilling sites and for pipelines, constructing enormous refineries and petrochemical processing facilities, and secondarily stimulating many other industries. As oil and gas reserves were depleted in the inland marshes, production moved offshore. This shift increased pressure for more and deeper navigation canals to link the offshore rigs with land-based facilities.

Production of oil and gas reached its peak in 1971 and has since been declining. However, the search for new oil continues, and wetland modification has by no means stopped. Louisiana's wetland management problems continue to be related to its major coastal industries-transportation and fossil fuel development (Gosselink, 1984). A network of medium-sized canals that are dredged for access to oil and gas well sites is linking the navigation canals to the inner marsh and to the flood drainage canals. These canals are extensive; their impacts are multiple. The canals themselves act like the navigation canals and, in combination with them, change circulation patterns extensively. For example, in the Leeville oil field (Terrebonne OOsin) the density of natural channels declined as dredged channels captured the flow of water. These canals also allow salt intrusion. Their spoil banks block the sheet flow of water across marshes, depriving them of sediments and nutrients. This is especially noticeable where canals interesect and their spoil banks interlock to impound or partially impound all area. The effect has not been quantified, but aerial photographs show the loss of marsh in these semi-impounded areas. The rest is attributed to indirect impacters of circulation disruption canals and associated spoil areas. (Gosselink, 1984). These impacts add to those caused by natural wetland loss and man-caused losses (i.e. Mississippi River levees, etc.).

d. Relationship Between Short-term Use and Long-term Productivity

Short term use of land located in wetlands, floodplains, and coastal zones, if properly mitigated, should not have any effect on long term productivity. Certain activities, if of extended duration, could have long term negative

impacts. See residual impacts section for a description of these impacts on long term productivity.

e. Irreversible or Irretrievable Commitment of Resources

Onshore pipeline construction may cause irretrievable marshland losses. These losses may be compensated by gain in estuarine area or roadway accessibility over selected trench backfill into otherwise inaccessible wildife and fishery habitat. There is no conclusive evidence that minor petroleum spills have resulted in an irreversible or irretrievable commitment of resources.

6. Wild and Scenic Rivers

a. Impacts

The Saline Bayou Scenic River, located on the Kisatchie NF could be impacted by leasing the minerals on the four FMO parcels located adjacent to the river. The intent of Congress when designating Wild and Scenic rivers under P.L. 90-542 was to preserve rivers that possess outstandingly remarkable scenic, recreation, geologic, fish and wildlife, historic, cultural or other similar values. Preservation shall be in a free-flowing condition, and the rivers and their immediate environments shall be protected for the benefit and enjoyment of future generations. Any activity which would negatively affect water quality, scenic, fish and wildlife, cultural, etc., values would be counter to the intent of P.L. 90-542.

The State also protects rivers under its Natural and Scenic Streams program (See Chapter III). Any impacts to state protected rivers would negatively affect this program.

b. Mitigating Measures

The Wild and Scenic Rivers Act, Section 9 and 10 describe protective measures to be taken to safeguard Wild and Scenic rivers. The surface managing agency has jurisdiction over prescribing protective stipulations. The Kisatchie NF is currently drafting a management plan which should address protective stipulations for the Saline Bayou Scenic River. Temporary management direction for a corridor surrounding the Saline Bayou Scenic River directs that oil and gas leasing will be allowed within the corridor, with a NSO stipulation, and that no common variety minerals will be leased. See the Kisatchie NF Forest Plan for elaboration on the above.

To comply with the State's Regulations regarding Natural and Scenic Streams, the following will govern:

> "In all planning for the use and development of water and water related land resources, full and equal consideration shall be given by all local, State and Federal agencies to the potential natural and scenic river areas; and all river basin reports and project plans should discuss such potential and all economic evaluations should consider aesthetic values as well as monetary values. No agency of the State government shall authorize or concur in plans of local or Federal agencies that would detrimentally affect, whether directly or indirectly, a natural or scenic river or upon which the full and equal consideration of the stream's potential as a natural or scenic area with aesthetic values has not been discussed and evaluated; or except as specifically authorized by the State legislature or by the system administrator. Evaluation of projects affecting natural or scenic streams shall rest upon an agency other than the construction agency, namely the Louisiana Office of State Planning and the Louisiana Recreation Advisory Council and any of their advisory committees hereinafter appointed for the specific purposes of advising on the quality of the environment." (LA Fish & Wildlife, 1981).

Uses of Louisiana Natural and Scenic streams prohibited by LA Acts 1970, No. 398; Acts 1981, No. 837 include channelization, clearing and snagging, channel realignment and reservoir construction on those rivers protected in State law Title 56, Chapter 8 R.S. 56: 1841-R.S. 56: 1849.

c. Residual Impacts

There should be no residual impacts to wild and scenic rivers.

d. Relationship Between Short-term Use and Long-term Productivity

Short-term uses will have no effect on long-term productivity.

e. Irretrievable or Irreversible Commitment of Resources

There will be no irretrievable or irreversible commitment of resources.

7. Air Quality

a. Impacts

Due to the relatively minor occurrences associated with BLM permitted surface-disturbing activities, impacts to air quality are almost negligible. Fugitive dust will be generated during various construction and land-clearing

operations when the land surface is sufficiently dry. In most cases, the construction of an oil and gas drill site or subsequent production facility will be localized and short term. Typically, such projects are completed in several days. In some cases, a centralized production facility is constructed to serve several wells. In such cases, the construction would occur over a longer period of time, in the order of several weeks. However, construction of centralized facilities is atypical.

Exploratory drilling would involve relatively small impacts from new road construction, especially in National Forests. Roads to abandoned sites will be reforested or utilized by the Forest Service if consistent with surface management plans.

Full-scale development drilling and surface facility construction would likely require more extensive road construction than exploratory drilling. The distance of transport, and areal impacters are expected to be the same as described in the soils section (all alternatives).

b. Mitigating Measures

Air quality is governed by the Environmental Protection Agency, the standards of which have been documented in Title 40 Part 50 (Subchapter C-Air Programs) of the Code of Federal Regulations. The maximum allowable quantities per unit of time are listed in the table below. Environmental lease stipulations will ensure that there will be no conflicts between the BLM plan recommendations and any State, local or other Federal air quality standards, plans or policies. Oil and gas exploration and development are not considered major projects subject to Best Available Control Technology (BACT) for the Prevention of Significant Deterioration (PSD) as are oil shale or coal operations.

Timber and vegetation stands adjacent to construction sites are expected to serve as wind breaks and largely preclude the generation of "dust clouds", as well as restrict the distance of dust transport. Vegetation damage by dust will be minimal because of high-intensity precipitation common in the State. Where heavy equipment will be required over a short-term, short distance, temporary "board roads" will be used. Vehicular traffic will generate the most significant amount of dust on clay-surfaced roads under dry-weather conditions.

Air Quality Standards

Pollutant	Standard
Sulfur Dioxide	
1. Annual Arithmetic Mean (ppm)	0.03
2. Maximum 24-Hour Concentration (ppm)	0.14
Nitrogen Dioxide	
1. Annual Arithmetic Mean (Hg/m^3)	100
Particulates	
1. Annual Geometric Mean (Hg/m^3)	75
2. Second Highest 24-Hour Maximum Concentration (Hg/m^3)	260
Ozone	
1. Maximum Number of Days per Year Greater than 0.12 ppm	1
Carbon Monoxide	
1. Second Highest Hour (Hg/m^3)	40,000
2. Second Highest 8 Hours (Nonoverlapping) (Hg/m^3)	10,000

c. Residual Impacts

Impacts are very short-lived and minor in scope. None of the impacts associated with BLM permitted activities would be considered as having a residual effect on the overall air quality rating for the State.

d. Relationship Between Short-Term Use and Long-Term Productivity

All impacts are considered short-term and insignificant. No long term impacts are anticipated.

e. Irreversible or Irretrievable Commitment of Resources

None

8. Soils (including Prime and Unique Farmlands)

8A. Soils

a. Impacts

The development of existing mineral leases could adversely affect soil productivity and stability on an undetermined acreage during soil removal and/or stripping until successful reclamation is achieved.

Impacts from the development of saleable minerals would occur in isolated locations throughout the planning area under all alternatives. Some locations occur on wetland sites with low reclamation potential which would decrease soil productivity as a result of disturbances.

Another source of impacts is soil contamination. In the exploratory drilling phase, chemical additives are sometimes used in the drilling mud, which is a

water-based slurry containing bentonite and other additives. These additives and the mud are sometimes expelled with the drill cuttings. When not properly contained in a pit, these materials may spill onto the surface, and contaminate the soil, posing a threat to vegetation and wildlife.

In southern Louisiana, the impact of mineral extraction on marsh soil occurs primarily through canals dredged for those operations.

The impacts described above will occur under the No Action Alternative as a result of non-Federal actions. The No Action Alternative constitutes the base line to which the impacts of Alternatives B and C would be added. The quantity of surface disturbance occurring under this alternative would be greater than under the other alternatives analyzed.

b. Mitigating Measures

Mitigating measures will be formulated on a case-by-case basis when the BLM permits any activity that will allow surface disturbing activities. Due to the various soil types, slopes, erosion factors, and other considerations, it is not feasible to clearly define mitigating measures until a proposal is submitted.

Certain mitigating measures are standard in all situations. During mineral exploration, development, and production, facilities are designed to eliminate run-off, infiltration, and contamination of the soil and soil profile through the use of standard measures such as debris basin, terraces, slope stabilization, ground covering, and the lining of ponds or pits. Topsoil will be stockpiled for use after reclamation, and the site will be reclaimed as per an approved plan of reclamation that is submitted prior to any surface disturbing activity.

c. Residual Impacts

Total surface acreage disturbed by onshore oil and gas exploration and development will differ in each alternative. The construction of facilities, access roads, pipelines and/or mining disturbances would affect an undetermined acreage of soil. Cumulative surface disturbances associated with mineral leasing will depend on location, number and type of projects developed.

Small scale earth moving and topographic alteration may occur in exploratory drilling or development phases. However, these operations are generally limited from 2 to 5 acres per drill site.

The access road constructed at the preliminary, exploratory, or drilling/development stage may shorter than 100 yards. The road is generally constructed as an artery connected to a country road. Distances of two miles or greater, of new constructing, may be necessary in isolated areas. The typical scenario in Louisiana is the construction of a 1/4 - 1/2 mile access road off a main or country road and denuding of 1 - 1 1/2 acres of soil. However, for APDs pending at this time, the longest new access road is 1/4 mile long. Roads may be maintained for permanent access or abandoned and restored to natural conditions.

During the development stage, the overall erosional impact is greater and of longer duration, but usually concentrated in a more specific limited area.

Each well site in a field is connected by roads, producing a crisscross multiple road system resulting in greater erosion potential. Each additional well increases the overall impact due to the successively larger cleared area involved.

Marsh soils affected by salt intrusion show loss of salt-intolerant plant species and, as the roots die, loss of peat-binding capacity and increase of peat erosion. Sediment supply through sheet flow of surface water across the marsh is also reduced, and the water on the marsh is more likely to stagnate than when freely flooded. Oil rig cuts typically displace marsh soils through construction of approximately 150-foot wide rectangular water bodies. These areas often contain drilling equipment at ends of canals which are about 70 feet wide when first dredged (Davis, 1972). Pipelines, whether for oil or gas, are narrower than rig cuts--about 40 feet wide when dredged (Barrett, 1970). They run in straight lines from a few kilometers to hundreds of kilometers.

Some of these impacts are inevitable. Overall, BLM permitted surface disturbing activities encompass only a minute portion of the total acreage in the State of Louisiana; therefore, residual impacts would be negligible.

d. Relationship Between Short-Term Use and Long-Term Productivity

For the duration and life of the activity, soil productivity would be removed. The impacts would be short-lived, and after reclamation, the soil would be utilized for its original intent. Often times, soil productivity and land use is enhanced and improved through the reclamation process. This results in a more useful and productive resource after reclamation, and is quite often a more valuable resource than it was prior to development.

e. Irreversible or Irretrievable Commitment of Resources

If BLM activities are accomplished using present day technology and mitigating measures, there should be no irreversible and irretrievable commitment of resources.

8B. Prime and Unique Farmlands

a. Impacts

BLM activities should have no impacts on Prime and Unique Farmland. This assumption is based on the definition in the Farmland Protection Policy Act (PL 97-98, 7 U.S.C. 4201) that states, in part, the purpose is to minimize the extent to which Federal programs contribute to the unnecessary and irreversible conversion of farmland to nonagricultural uses and that Federal programs will be administered in a manner that, to the extent possible, will be compatible with State, local and private program policies to protect farmland.

BLM surface disturbing activities are short lived. After permitted activities cease, the surface is reclaimed. Often times the land is in a more useable condition than it was prior to the BLM permitted activity.

b. Mitigating Measures

Procedures in the BLM permitting process mandate that, prior to surface disturbance, an operator must submit a detailed plan of reclamation and revegetation. Top soil will be stockpiled and saved for the reclamation process.

Prior to the issuance of a Recreation and Public Purpose (R&PP) permit, or disposal of any BLM surface acreage, the BLM will consult with the Soil Conservation Service to assess potential impacts to this resource.

c. Residual Impacts

No residual impacts are anticipated.

d Relationship Between Short-Term Use and Long-Term Productivity

Since no impacts are anticipated, there will be no loss of short-term use or long-term productivity.

e. Irreversible or Irretrievable Commitment of Resources

None are expected.

9. Vegetation

a. Impacts

Primary source of impacts to vegetation is from oil and gas exploration and development. One of the major impacts of oil and gas operations begins with the preliminary investigation phase. Vegetation clearing in the course of constructing access roads and trails, and clearing between shot holes for seismic testing lines is often necessary. With vegetation removed, increased soil surface temperature and compaction may retard conditions necessary for revegetation. Terrestrial vegetation adjacent to construction can also be impacted indirectly by soil erosion. In the case of aquatic vegetation, the impacts are indirect through the introduction of sediments or chemicals into water resources.

Exploratory drilling has a greater impact on the areas affected than does preliminary investigation. Road construction and site clearance for wildcat well drilling and supporting activities result in direct removal of vegetative cover. In this phase, any oil, drilling mud, or briny water escaping the drilling site could be phytotoxic. Temporary elimination of vegetation may result from soil sterilization.

During the development phase, terrestrial vegetation is removed for construction of permanent access roads, additional seismic lines, pipelines, electrical transmission lines, treatment areas, and additional drilling sites. Construction activities may also include campsites, permanent work buildings, airstrips, dams, and other impoundments which would cause further impact to the area. The primary difference between the exploratory and development phase is that the latter concentrates surface disturbance activities on a specific area and is more permanent in nature.

For the more level areas, an average of 1.5 to 2.5 acres of land will be cleared of vegetation, open to contamination from spilled oil, salt water or drilling chemicals, and subject to compaction all due to drill site construction. Based on an average 3.5 acres per mile, an additional 1 to 1.5 acres of land will be cleared for access road construction.

Drilling time varies according to machinery used, subsurface formations, and depth of desired structure. An average drilling time for all methods is from 45 to 60 days. If production is feasible, a smaller area (one half acre) will generally remain unvegetated for as long as the well produces. Wells can produce economic volumes of petroleum for fifteen to twenty years. Access roads are usually maintained for local access after the well is abandoned.

During the production phase, the major impact on terrestrial and aquatic vegetation is from toxic elements: oil leaks, spills, and disposal of liquid and solid wastes. The production phase represents more potential damage than earlier phases. The probability of accidental leaks and spills is increased with additional flowlines and the use, when applicable, of trucks to transport oil. Flowlines, valves, and pumps in use over the longer production period may become corroded and subject to leaks. Any disposal of toxic gases into the atmosphere can cause additional extensive damage to the vegetation.

b. Mitigating Measures

Impacts resulting from current management are mitigated through Onshore Oil and Gas Order No. 1, Approval of Operation on Onshore Federal and Indian Oil and Gas Leases issued under 43 CFR 3164. Surface disturbance impacts and their effect on vegetation due to non-renewable resource development would be mitigated by prompt reclamation and revegetation with adapted species.

c. Residual Impacts

Under normal situations, drill sites which are shut down and reclaimed will have no residual impacts to vegetation. Sites which are actively producing for long time periods may have residual impacts from contamination by oil, distillates, salt water, etc. Soil contaminated by oil, distillates, salt water, drilling chemicals or other contaminents will probably inhibit re-establishment of all pre-spill vegetation.

Clearing trees and other vegetation creates a debris disposal problem. Trees removed through the surrounding stands can damage valuable standing timber, create conditions favorable for forest insect and disease outbreaks, increase fire hazard problems, and detract from an area's aesthetic resources.

d. Relationship Between Short-term Use and Long-term Productivity

In the short term, vegetative productivity will be lost from sites used for drilling rigs, production facilties, pipelines, etc. In the long term, provided these sites are properly reclaimed, there should be no impact to vegetative productivity. In some situations, reclaimed sites may be more productive than they were originally because of the use of fertilizers, superior plant species and advanced revegetation techniques.

e. Irretrievable or Irreversible Commitment of Resources

Under normal conditions, there would be no irretrievable or irreversible commitment of the vegetative resource.

10. Cultural Resources

a. Impacts

The Management common to all alternatives section in chapter 2 describes current management of cultural resources by BLM. Cultural clearances prior to surface-disturbing activity and Federal lands transfer actions will continue to insure minimal or no impact to cultural resources found in proximity to BLM-managed lands or minerals. Site surveys prepared at the request of the State Historic Preservation Officer (SHPO) during site-specific clearances would protect sites eligible for the National Register and increase knowledge of prehistoric cultures in the State.

Activities associated with oil and gas development provide the greatest potential for site destruction; however, the clearance process and the limited acreage involved in actual development (see Mineral Resources Section) appear to minimize the potential for impact.

b. Mitigating Measures

Compliance with legislation, the National Historic Preservation Act of 1966 (P.L. 96-515), as amended, and regulations (36 CFR 800) relating to cultural resource consideration and protection. Chapter 2 outlines the process.

c. Residual Impacts

Any surface disturbing activity (such as oil and gas drilling) has the potential for causing the loss of unknown buried archaeological resources which were not known about during consultation as discovered during inventory.

d. Relationship Between Short-term Use and Long-term Productivity

Actions involving mineral development or land transfer may allow current recovery of cultural resource data, but would preclude data recovery by improved techniques in the future. Extensive surface disturbance also would alter the regional environmental and cultural context, which could make systematic study and future prehistoric and historic cultural reconstruction difficult. The beneficial, long-term impacts from proposed Federal actions will be the accumulation of knowledge about the cultural history and prehistory of the general region as a result of required inventories.

e. Irreversible or Irretrievable Commitment of Resources

Cultural resources are non-renewable. Once destroyed, they cannot be replaced.

11. Visual Resources

a. Impacts

The major impacts to visual resources in the State result from oil and gas drilling operations.

The impacts consist of, but are not limited to, the drilling apparatus and appurtenant structures. The drilling rig itself averages 100 to 150 feet in height. The impact from this structure is relatively short-lived, depending

on the depth of the hole being drilled. On an average, the drill rig usually stays on location for approximately one (1) month. Other structures (storage tanks, heater treaters, pipelines, etc.) will stay on location for the duration of the producing well. These structures are shorter and less noticeable than the drill rig itself, and are much more aesthetically pleasing to the eye.

Only twelve of the fifty-four public domain parcels in Louisiana have been found to be clear of title conflicts. None of these 12 parcels are near public use areas (i.e., parks, wildlife management areas, etc.). During the process of transferring these lands (under the R&PP Act, or for withdrawal or sale), the visual resource values will be assessed. This assessment will also be made on any of the tracts cleared of title conflicts and considered for transfer in the future.

b. Mitigating Measures

Every effort will be made to insure that the drill rig and appurtenant structures blend in with the surrounding land forms and features. In addition, rig placement away from existing roads and recreation areas will be accomplished where feasible.

c. Residual Impacts

The drill rig itself will be removed as soon as possible after drilling operations cease. In Louisiana, this usually lasts for a period of approximately one (1) month. Other structures will remain as long as production continues.

After production ceases, the site will be reclaimed. Therefore, no residual impacts are anticipated.

d. Relationship Between Short-term Use and Long-term Productivity

There are no expected impacts to either short-term use or long-term productivity.

The drilling apparatus itself, the least aesthetically acceptable impactor, should be on location for approximately a month, on the average. The appurtenant structures will be on location for the duration of a producing well. However, these structures are less obtrusive and sparsely placed. They should have no impact to either short-term use or long-term productivity.

e. Irreversible or Irretrievable Commitment of Resources

All sites will be completely restored and reclaimed after the area ceases production. Often times the area, after reclamation, is more useable and aesthetically acceptable than it was prior to the surface-disturbing activity. Therefore, there are no irreversible or irretrievable commitment to the parameter of visual resources.

12. Wilderness

a. Impacts

No BLM lands have qualified for Wilderness designation; therefore, the

transfer or sale of cleared tracts will have no impact to Wilderness. The only Federally-designated Wilderness area is on U.S. Forest Service lands. Both the management and impact of mineral activity to the Kisatchie Hills Wilderness Area was addressed in the Forest Land Management Plan (FLMP). Two other areas of the Forest addressed in the FLMP are also being considered for designation.

In the 8,700 acre Kisatchie Hills area, the Federally-owned minerals were withdrawn from mineral entry and mineral leasing after December 31, 1983, subject to valid existing rights. If the two areas recommended for designation become Wilderness areas, the Federally-owned minerals would be withdrawn after existing leases expire. Of the 8,578 acres being considered for designation, only about 2,400 acres of the mineral estate is Federally-owned. The mineral rights on the remaining acreage are outstanding in perpetuity and would continue to be subject to exploration and development after designation.

According to the Kisatchie FLMP, the "main impacts from mineral activities are drilling and its associated needs for access road construction". Even with designation, these impacts could occur on three-fourths of the acreage being considered.

b. Mitigating Measures

The USFS is responsible for developing mitigating measures to protect Wilderness attributes on those lands available to mineral leasing. The ultimate protection of Wilderness lands is the withdrawal of the Federal mineral estate from mineral entry. In the areas being considered for addition to the Kisatchie Wilderness, the mineral estate is privately owned on about 6,000 acres. In this situation, the Federal Government has very little control over surface management. Mitigating measures to protect the Federal surface can be recommended, but not necessarily enforced.

c. Residual Impacts

Mineral activities within a classified Wilderness could have residual impacts on Wilderness quality. Areas which have been disturbed by minerals activities may take a significant amount of time to return to a state where the land "generally appears to have been affected primarily by the forces of nature, with the imprint of man's work substantially unnoticeable."

d. Relationship Between Short-term Use and Long-term Productivity

There should be little or no effect on long-term productivity by short-term uses.

e. Irreversible or Irretrievable Commitment of Resources

There will be no irretrievable or irreversible commitment of the Wilderness resource under this alternative.

13. Areas of Critical Environmental Concern (ACEC's)

There are no ACEC's in Louisiana; therefore, there will be no impacts resulting from BLM actions.

14. Socio-Economics

a. Impacts

The economic impacts of Federal mineral leasing and development decisions are positive. Mineral leasing yields royalty income (bonus bids) and annual lease payments which vary depending upon the mineral leased and the demand at the time of the lease sale. Mineral development brings economic impacts, including direct and indirect income, capital investment, profit or loss from mineral sales, bonus bid and royalty income, and severance tax collections. The degree of economic impact will vary from mineral to mineral, parish to parish, or project to project. Market demand is the key to development and the resultant income.

Basically, Federal leasing results in three direct public income impacts: Leases bonus, rental and, if production results, royalty income. All lands must be exposed to competitive interest for a legislated minimum $2.00 per acre bid. The primary term of a competitive lease is five years. Lands which do not receive competitive interest are available for non-competitive leasing. Parcel size may not exceed 2,560 acres in the lower 48 States. The royalty rate is be 12 1/2% for both competitive and non-competitive leases and rental for competitive leases is $1.50 per acre for the first five years and $2.00 per acre thereafter.

Sales are held on a quarterly basis in States where eligible lands are available and public notice is provided 45 days prior to offering lands for lease.

Should a lease be issued on a non-competitive basis the primary term is ten years and the lease rental is $1.00 per acre.

When a lease becomes productive the term of a lease is extended beyond the primary term as long as production continues.

The other minerals which show potential for leasing in the future are sodium, sulfur and lignite. The royalty to be received for sulfur is 5 percent of the quantity or gross value of the output of sulfur at the point of shipment to market. Rental for sulfur is at 50 cents per acre. Royalty for sodium is established on a case-by-case basis, with a minimum annual royalty of $3 per acre. Rental payment for sodium leases is 25 cents for the first year, 50 cents for each of the second thru the fifth year, and $1 for the sixth and each succeeding year thereafter. Lignite will be leased competitively with a bonus bid, annual rental, and royalty payment to BLM. Leasing and development of lignite will be done in accordance with the coal management section of BLM regulations. Accordingly, the minimum bonus bid will not be less than $100 per acre (highest bidder is awarded the lease), rental is $3 per acre per year, and royalty for surface mining is set at 12 1/2 percent.

One half of the royalty received by BLM for the leasing and development of Public Domain minerals is returned to the State. The State also receives up to one half of the bonus, rent and royalty derived from acquired lands. However, the percentage on acquired lands varies depending on the authority under which the property was acquired. At present, the Louisiana is receiving a portion of the bonus, rent and royalty for oil and gas leasing and production. This will continue into the forseeable future. Although there is potential for royalties from lignite, sulfur and sodium leasing.

There is potential for Federal revenue generation as a result of public land sales; however, there is very little cleared land available for sale.

b. Mitigating Measures

None

c. Residual Impacts

None

d. Relationship Between Short-term Uses and Long-term Productivity

In the short term, social and economic conditions would not be significantly affected by management proposals under any of the alternatives. In the long term, the current management alternative should result in the highest Federal productivity because there would be less restrictions on mineral leasing and development than under the other alternatives.

e. Irreversible or Irretrievable Commitments of Resources

No irreversible or irretrievable commitments are anticipated.

15. Recreation

a. Impacts

Local, State and Federal recreation areas are scattered throughout the State; however, BLM mineral leasing and development actions are not anticipated to negatively impact recreation resources. Past BLM experience in Northwest Louisiana around Caddo and Cross Lakes has proved that oil and gas development can be mitigated to minimize or preclude any negative physical, visual or public safety impacts to recreation areas. Existence of recreation resources adjacent to an area subject to an application for permit to drill automatically escalate an action from categorical exclusion to an action requiring an environmental assessment (EA). During the EA development, mitigation measures can be developed with the surface managing agency and the oil and gas operator.

Solid minerals leasing and development actions are not anticipated in the planning horizon; however, if they occur, EA's will be developed to evaluate and mitigate impacts as outlined above.

Under the current management alternative, BLM would clear up title problems and respond to application on PD lands. If the cleared tracts are transferred under the R & PP Act, the impacts on the human environment should be positive. Prior to any transfer, a land report and environmental document will be prepared to evaluate the application and related management plan. Any negative environmental consequences can be mitigated by altering the management plan.

b. Mitigating Measures

If BLM decisions will affect recreation areas then stipulations will be utilized to mitigate impacts on recreation. For example, seasonal restrictions can be placed on mineral operations to allow development during "off season" or low use periods Also, visual and noise barriers can be used

to mitigate sight or sound impacts. If the recreation areas is managed by an SMA, they will either deny or give consent for leasing and dictate stipulations upon which their consent is based.

c. Residual Impacts

Drilling operations are temporary and there should be no residual impacts. Production operations near recreation areas may have noise or visual impacts; however, these should be mitigated. Public domain land transfers, except those under the R&PP Act, allow the recipient the rights to manage the land as they desire. This may result in residual adverse impacts to public recreation areas if the land is cleared and/or constructed upon after transfer.

d. Relationship Between Short-term Use and Long-term Productivity

Drilling operations in or near recreation areas may impact those resources in the short term. However, in the long term productivity will be maximized for recreation resources and mineral resources.

e. Irreversible or Irretrievable Commitment of Resources

No irreversible or irretrievable commitments are anticipated.

16. Transportation

a. Impacts

Future levels of oil and gas production on BLM leases are not expected to increase significantly. Present production is transported primarily by pipeline or road, and any impacts on the existing system are temporary and not significant. Impacts will be slightly different under all alternatives, however, they should be transient and insignificant.

b. Mitigating Measures

Construction of access roads will be done according to BLM or SMA manuals, and roads will be located so as not to detract from aesthetic or scenic areas.

c. Residual Impacts

No residual impacts are anticipated.

d. Relationship Between Short-term Use and Long-term Productivity

Not applicable.

e. Irreversible or Irretrievable Commitment of Resources

None

17. Hazardous Wastes

Two inventories have been conducted to date which show no sites near enough to impact BLM resources. Monitoring of sites will be continued.

Alternative B (Protection Alternative) Environmental Consequences of the Protection Alternative

Alternative B emphasizes the maintenance or improvement of environmental or cultural values and protection of fragile and unique resources. Land tenure adjustments and mineral leasing and development actions would be permitted to the extent of their compatibility with the environmental protection emphasis.

Land tenure decisions under this alternative would favor transfer under the Recreation and Public Purposes Act or withdrawal to another Federal agency which could manage lands in a protective mode. Of the fifty-eight tracts inventoried in planning process, 11 are near State fish and game or wildlife preserves (3 tracts are clear of title problems), 18 are in high priority cultural area (3 are clear), 4 cleared tracts are in the highest priority cultural area, 11 tracts are near public use areas (2 are clear), and 14 are near environmental concern areas (4 are clear of title problems). Only 8 tracts were not in any environmentally or culturally sensitive areas or any public management or use areas. Of these 8 tracts, only 3 are clear of title problems. These are the only tracts with a probability of public sale under this alternative.

1. Mineral Resources

1A. Mineral Development

a. Impacts

As stated under the Alternative A, the primary impact on minerals is the degree of availability of land for mineral development. Under Alternative B, there would be an increase in areas with special stipulations, including no surface occupancy. These stipulations would be concentrated in, but not limited to, the areas highlighted for special concern by BLM on Figure 27. Extensive use of the no surface occupancy stipulations would result in higher drilling and development costs, as directional drilling would be necessary. Increased drilling and development costs could result in limited activity especially with the present market conditions and price of oil. This impact would occur only on those lands not yet developed.

Special stipulations limiting areas available for mineral development are recommended for the following threatened and endangered wildlife species: bald eagle, brown pelican, red-cockaded woodpecker, gopher tortoise, Louisiana pearlshell mussel and ringed sawback turtle. The seasonal and areal stipulations for prime eagle nesting habitats affect approximately 750 acres of FMO under private surface, five (5) public domain parcels, ten (10) Corps of Engineer projects with FMO, a portion of the Jean Lafitte National Park, and a 50-acre Coast Guard facility. The special stipulations would be applied site-specifically on any mineral development on the above tracts (excluding the national park which is closed by law).

The protective measure under this alternative for the brown pelican would require the withdrawal of Queen Bess Island in Jefferson Parish from mineral entry.

Alternative B (Protection Alternative) Environmental Consequences of the Protection Alternative

Alternative B emphasizes the maintenance or improvement of environmental or cultural values and protection of fragile and unique resources. Land tenure adjustments and mineral leasing and development actions would be permitted to the extent of their compatibility with the environmental protection emphasis.

Land tenure decisions under this alternative would favor transfer under the Recreation and Public Purposes Act or withdrawal to another Federal agency which could manage lands in a protective mode. Of the fifty-eight tracts inventoried in planning process, 11 are near State fish and game or wildlife preserves (3 tracts are clear of title problems), 18 are in high priority cultural area (3 are clear), 4 cleared tracts are in the highest priority cultural area, 11 tracts are near public use areas (2 are clear), and 14 are near environmental concern areas (4 are clear of title problems). Only 8 tracts were not in any environmentally or culturally sensitive areas or any public management or use areas. Of these 8 tracts, only 3 are clear of title problems. These are the only tracts with a probability of public sale under this alternative.

1. Mineral Resources

1A. Mineral Development

a. Impacts

As stated under the Alternative A, the primary impact on minerals is the degree of availability of land for mineral development. Under Alternative B, there would be an increase in areas with special stipulations, including no surface occupancy. These stipulations would be concentrated in, but not limited to, the areas highlighted for special concern by BLM on Figure 27. Extensive use of the no surface occupancy stipulations would result in higher drilling and development costs, as directional drilling would be necessary. Increased drilling and development costs could result in limited activity especially with the present market conditions and price of oil. This impact would occur only on those lands not yet developed.

Special stipulations limiting areas available for mineral development are recommended for the following threatened and endangered wildlife species: bald eagle, brown pelican, red-cockaded woodpecker, gopher tortoise, Louisiana pearlshell mussel and ringed sawback turtle. The seasonal and areal stipulations for prime eagle nesting habitats affect approximately 750 acres of FMO under private surface, five (5) public domain parcels, ten (10) Corps of Engineer projects with FMO, a portion of the Jean Lafitte National Park, and a 50-acre Coast Guard facility. The special stipulations would be applied site-specifically on any mineral development on the above tracts (excluding the national park which is closed by law).

The protective measure under this alternative for the brown pelican would require the withdrawal of Queen Bess Island in Jefferson Parish from mineral entry.

b. Mitigating Measures

In addition to the mitigating measures found in Alternative A, the following protective stipulations will be required.

Where consultation indicates the area is especially sensitive or there is critical endangered species habitat, no surface occupancy stipulations will be employed at leasing.

Surface disturbing activities would be prohibited within one half mile of active redcockaded woodpecker colonies during the nesting season (April 1 through July 1).

Oil and gas operations involving any construction or development activities would be seasonally restricted within the general wintering waterfowl area (Figure 9) where wetlands or open water are present. The no surface occupancy stipulation would be in effect from October 15 through March 1.

The following U.S. Fish and Wildife Service protective guidelines will be included in all leases occurring in areas identified as having eagle nests. Such guidelines will be considered conditions of approval of any applications for permit to drill submitted after lease issuance.

A. Primary Zone: This is the most critical area immediately around the nest, and must be maintained to promote optimum conditions for eagles.

1. Size: Except under unusual circumstances (e.g., where a particular pair of bald eagles is known to be tolerant of closer human activity), the boundary of the primary zone should not be less than a 1,500-foot radius (457 meters) from the nest tree.

2. Recommended Restrictions: No activity in the primary zone at any time.

B. Secondary (Buffer) Zone: The purpose of this zone is to minimize disturbance that might weaken the integrity of the primary zone, protect important areas outside of the primary zones, and encompass lands that provide suitable habitat in the future.

1. Size: It should lie outside the primary zone and have a minimum circular radius of 1 mile (1,609 meters).

2. Recommended Restrictions:

(1) Limit the building of new roads, modification of access roads and canal improvements facilitating access to the nest.

(2) No major activities will be allowed to occur in this zone during the nesting period October 1 through May 15. Examples are logging, seismographic activities employing explosives, oil well drilling, and low altitude reconnaissance flights (100 to 500 feet).

Surface occupancy restrictions to protect the endangered brown pelican are as follows. No surface occupancy will be allowed at any time within 1500' buffer zone surrounding a nesting site. Queen Bess Island, a known nesting site, will be withdrawn from mineral entry.

All discretionary land tenure decisions would include a patent restriction, conservation easement, etc., which would protect the wetland character of important waterfowl areas. Where possible, important waterfowl areas will be transferred to a wildlife management agency, such as the USFWS or the Louisiana Fish and Game Commission.

c. Residual Impacts

The withdrawal of Queen Bess Island would eliminate the opportunity to develop minerals on that site as long as the withdrawal was effective.

d. Relationship Between Short-term Use and Long-term Productivity

See Alternative A

e. Irretrievable or Irreversible Commitment of Resources

None

4. Water Resources

a. Impacts

Under this alternative, areas that are normally leased, would be withheld from leasing, resulting in the fewer impacts to water resources. In addition, a more widespread use of the No Surface Occupancy stipulation would further mitigate impacts to water resources.

Strict adherrence to the NSO stipulation would drastically reduce the number of exploratory wells, thus reducing the number of producing wells and their appurtenant structures.

With fewer wells being drilled, the impacts outlined in Alternative A would be greatly reduced. Acreage figures for surface occupancy are not predictable; however, a figure of at least 50% fewer drilling operations could be considered reasonable. If this should occur, impacts to water resources would be lessened two fold, and cumulative impacts, if any, would be reduced by an even greater percentage.

b. Mitigating Measures

Mitigating measures under this alternative would be identical to those outlined in Alternative A.

In addition, a wide spread use of the No surface Occupancy stipulation would be in effect. This would further mitigate impacts to water resources.

Also, other mitigating measures including the requirements of directonal drilling, rig re-location, and etc. would add to the aforementioned mitigation.

c. Residual Impacts

Residual impacts under the alternative would be negligible.

d. Relationship Between Short-term Use and Long-term Productivity

Under this alternative, water resources should not receive any short-term loss in usage nor should their long-term productivity be affected.

e. Irreversible or Irretrievable Commitment of Resources

None of the impacts to water resources under this alternative are considered to be either irreversible or irretrievable.

5. Floodplains, Wetlands and Coastal Zones

a. Impacts

Impacts to floodplains, wetlands and coastal zones would be less under this alternative than under alternative A or C. Utilization of no surface occupancy stipulations for oil and gas activities in wetland areas would greatly lessen impacts to that resource. A rough estimate of FMO in wetland areas is 7,000 acres (see minerals impacts discussion). Fewer negative impacts would be expected in riparian zones under this alternative as a result on no surface occupancy stipulations.

b. Mitigating Measures

In addition to mitigation outlined in Alternative A, the following protective stipulations would be used.

No surface occupancy for oil and gas facilities (drill pads, production facilities, etc.) will be allowed within 300' of perennial streams and water bodies, and no surface occupancy within defined intermittent streambeds.

There will be no surface occupancy for oil and gas facilities within wetland areas (as defined by the USFWS, 1979).

APD's which appear to impact riparian or wetland areas will be field checked prior to permit issuance, to ensure compliance with the above stipulations.

In addition to mitigation outlined in alternative A for discretionary land tenure decisions, wetland tracts will be transferred to State or Federal Conservation agencies wherever possible.

c. Residual Impacts

Residual impacts to wetlands and coastal zones would be greatly reduced under this alternative, as no surface occupancy for oil and gas activities would eliminate additional channelization, dredge and fill operations, etc. on Federal leases in wetlands.

d. Irreversible and Irretrievable Commitment of Resources

There would be no irreversible or irretrievable commitment of resources under this alternative.

6. Wild and Scenic Rivers

See discussion for Alternative A

7. Air Quality

a. Impacts

Under this alternative, impacts to air quality would be somewhat less than Alternative A or C, primarily because of less extensive development as a result of more restrictive mitigation for all resources throughout the alternative.

b. Mitigating Measures

Same as Alternative A.

c. Residual Impacts

None

d. Relationship Between Short-term Use and Long-term Productivity

All impacts are considered to be of short-term duration and minimal.

e. Irreversible or Irretrievable Commitment of Resources

None

8A. Soils

a. Impacts

Under this alternative, extensive use of the No Surface Occupancy stipulation would result in higher drilling and development costs, as directional drilling would be necessary. Increased drilling and development costs could result in limited activity especially with the present market conditions and price of oil. This impact would occur only on those lands not yet developed. As a result, impacts to soils would be greatly reduced. Only a small portion of the acreage utilized under Alternative A, would be disturbed and impacts would range from minimal to nonexistant.

b. Mitigating Measures

The use of the No Surface Occupancy stipulation would result in much less acreage disturbed by BLM permitted activities.

In addition, those measures outlined in Alternative A would be utilized where surface disturbing activities are permitted.

c. Residual Impacts

The residual impacts would be greatly reduced as a result of No Surface Occupancy (NSO). Impacts would be minimal depending on the severity of enforcement of NSO stipulation.

d. Relationship Between Short-term Use and Long-term Productivity

See Alternative A

e. Irreversible or Irretrievable Commitment of Resources

See Alternative A

8B. Prime and Unique Farmlands

See Alternative A.

9. Vegetation

a. Impacts

Impacts to vegetation would be less under this alternative than alternative A or C. Impacts would be less due to more stringent mitigating measures required under this alternative, and because fewer acres of land would likely be leased. (See the introduction section of this alternative for an explanation of reduction in acres leased).

b. Mitigating Measures

In areas where sensative vegetation has been identified through consultation with the USFWS and Louisiana Natural Heritage Commission, no surface occupancy stipulations will be incorporated into leases and permits. These stipulations will be developed on a case-by-case basis to fit the needs of the site.

c. Residual Impacts

The possibility of residual impacts would be less under this alternative than under Alternative A or C. The possibility for residual impacts does however still exist. See Alternative A for a description of these potential impacts.

d. Relationship Between Short-term Use and Long-term Productivity

See Alternative A

c. Residual Impacts

Residual impacts to wetlands and coastal zones would be greatly reduced under this alternative, as no surface occupancy for oil and gas activities would eliminate additional channelization, dredge and fill operations, etc. on Federal leases in wetlands.

d. Irreversible and Irretrievable Commitment of Resources

There would be no irreversible or irretrievable commitment of resources under this alternative.

6. Wild and Scenic Rivers

See discussion for Alternative A

7. Air Quality

a. Impacts

Under this alternative, impacts to air quality would be somewhat less than Alternative A or C, primarily because of less extensive development as a result of more restrictive mitigation for all resources throughout the alternative.

b. Mitigating Measures

Same as Alternative A.

c. Residual Impacts

None

d. Relationship Between Short-term Use and Long-term Productivity

All impacts are considered to be of short-term duration and minimal.

e. Irreversible or Irretrievable Commitment of Resources

None

8A. Soils

a. Impacts

Under this alternative, extensive use of the No Surface Occupancy stipulation would result in higher drilling and development costs, as directional drilling would be necessary. Increased drilling and development costs could result in limited activity especially with the present market conditions and price of oil. This impact would occur only on those lands not yet developed. As a result, impacts to soils would be greatly reduced. Only a small portion of the acreage utilized under Alternative A, would be disturbed and impacts would range from minimal to nonexistant.

b. Mitigating Measures

The use of the No Surface Occupancy stipulation would result in much less acreage disturbed by BLM permitted activities.

In addition, those measures outlined in Alternative A would be utilized where surface disturbing activities are permitted.

c. Residual Impacts

The residual impacts would be greatly reduced as a result of No Surface Occupancy (NSO). Impacts would be minimal depending on the severity of enforcement of NSO stipulation.

d. Relationship Between Short-term Use and Long-term Productivity

See Alternative A

e. Irreversible or Irretrievable Commitment of Resources

See Alternative A

8B. Prime and Unique Farmlands

See Alternative A.

9. Vegetation

a. Impacts

Impacts to vegetation would be less under this alternative than alternative A or C. Impacts would be less due to more stringent mitigating measures required under this alternative, and because fewer acres of land would likely be leased. (See the introduction section of this alternative for an explanation of reduction in acres leased).

b. Mitigating Measures

In areas where sensative vegetation has been identified through consultation with the USFWS and Louisiana Natural Heritage Commission, no surface occupancy stipulations will be incorporated into leases and permits. These stipulations will be developed on a case-by-case basis to fit the needs of the site.

c. Residual Impacts

The possibility of residual impacts would be less under this alternative than under Alternative A or C. The possibility for residual impacts does however still exist. See Alternative A for a description of these potential impacts.

d. Relationship Between Short-term Use and Long-term Productivity

See Alternative A

e. Irreversible or Irretrievable Commitment of Resources

See Alternative A

10. Cultural Resources

a. Impacts

The maximum protection alternative would differ from the current management alternative through the inclusion of additional protective stipulations, including the possibility of no surface occupancy. The major effects of these protective stipulations on BLM activities are outlined in the introducton and mineral resources sections of this discussion. The impact on cultural resources would be both positive and negative. The obvious positive effect would be the decreased potential for damage to resources because of the reduction in surface disturbing activity. Also, additional site survey or inventory requirements should bring additional location data of cultural properties and additional knowledge of the history of certain areas of Louisiana. The negative impact of a No Surface Occupancy stipulation is the loss of potential accumulated knowledge of cultural history and prehistory that would have resulted from required inventories.

b. Mitigating Measures

No surface occupancy would be applied on areas identified by the SHPO as highest priority cultural sites (See Figure 15). A survey will be required on all areas identified by the SHPO as having a high probability for occurrance of cultural sites. Activities in other areas would still require SHPO consultation on a case-by-case basis.

c. Residual Impacts

Residual impacts would be the same as those discussed under the current management alternative. However, the potential for residual impact is lessened by the increased use of restrictive stipulations.

d. Relationship Between Short-term Use and Long-term Productivity

Same as Alternative A.

e. Irreversible or Irretrievable Commitment of Resources

Same as Alternative A.

11. Visual Resources

a. Impacts

Under this alternative, areas that are normally leased, would be withheld from leasing, resulting in fewer impacts to visual resources. In addition, a more wide spread use of the No Surface Occupancy stipulation would further eliminate impacts to visual resources. Strict adherence to the maximum

protection alternative would result in areas considered for surface occupancy that are completely out of sight-range for roads, dwellings, recreation areas, and, etc. There would be little or no impacts to visual resources under this alternative.

b. Mitigating Measures

Mitigating measures under this alternative would include, but not limited to, no leasing of specified areas close to line-of-sight areas, widespread use of the no surface occupancy stipulation, use of camouflage, restricting rig height, restricting the amount of appurtenant structures, and specified paint schemes for equipment placed on the lease.

c. Residual Impacts

There would be no anticipated residual impacts if the maximum protection alternative is utilized.

d. Relationship Between Short-term Use and Long-term Productivity

Under this alternative, much less surface disturbance would occur, resulting in few, if any, impacts to visual resources. After reclamation, none of the impacts would remain.

e. Irreversible or Irretrievable Commitment of Resources

There would be no irreversible or irretrievable commitment of visual resources.

12. Wilderness

See discussion for Alternative A

13. Areas of Critical Environmental Concern

See discussion for Alternative A

14. Socio-Economics

a. Impacts

Extensive use of the No Surface Occupancy stipulation would result in higher drilling and development costs, as directional drilling would be necessary. Increased drilling and development costs might result in limited activity especially with the present market conditions and price of oil. This impact would occur only on those lands not yet developed.

This would result in loss of jobs, income, royalty, severence taxes and other positive impacts of Federal mineral leasing and development. The loss would not be significant by itself but would contribute to the already dismal economic picture in Louisiana. If the price of oil goes up and the market for domestic production improves, this alternative would decrease the Federal acreage available to participate in the improved market situations.

b. Mitigating Measures

None

c. Residual Impacts

None

d. Relationship Between Short-term Use and Long-term Productivity

Same as Alternative A.

e. Irreversible or Irretrievable Commitment to Resources

Same as Alternative A.

15. Recreation

a. Impacts

Under Alternative A emphasis would be placed on maximizing preservation-related or low-impact recreational uses. The tracts of P.D. land near recreation areas would probably be transferred under the R&PP Act. Six BLM parcels are located near five different State Wildlife Areas. Only two of the tracts are clear of title conflicts. One is located in St. Martin Parish near Attakappas Island State Wildlife Area, and one is in Rapides Parish near the Sabine State Wildlife Area. Five BLM parcels are located in or near State game and fish preserves, in Bienville, Bossier, Vernon, and Natchitoches parishes. The only clear parcel, however, is located in Natchitoches near the Northwest Louisiana Game and Fish Preserve. The State may consider acquiring these three large, clear tracts (totalling almost 340 acres) under the Recreation and Public Purposes (R&PP) Act for inclusion in the preserve or wildlife area. The remaining cleared tracts in Acadia, DeSoto, Iberia and Vermillion parishes (totalling less than 75 acres) may also be considered for R&PP transfer to the State, parish, or local governmental entities. The Natchitoches tract is located near Black Lake and the Winn Ranger District of the Kisatchie National Forest. The Rapides tract is located near Big Sabine Bayou and the Catahoula Ranger District. The St. Martin tract is in the coastal zone and in the prime eagle nesting area.

Federal Mineral leasing and development near recreation areas would be stipulated in order to prevent impacts to those areas.

b. Mitigating Measures

Seasonal stipulations, No Surface Occupancy (NSO) stipulations, requirements for visual or noise barriers and other mitigating measures will be applied on a case-by-case basis for any actions affecting recreation areas.

c. Residual Impacts

Same impacts as discussed in Alternative A

d. Relationship Between Short-term Use and Long-term Productivity

Increased mitigation to protect recreation areas in the short-term may reduce long term productivity for mineral resources.

e. Irreversible or Irretrievable Commitments of Resources

NSO stipulations to protect recreation areas may render mineral resources irretrievable, however, this commitment would not be irreversible.

16. Transportation

See discussion for Alternative A

17. Hazardous Waste

a. Impacts

See alternative A.

b. Mitigating Measures

In addition to the mitigation outlined in Alternative A, EPA hazardous waste site lists will be reviewed prior to issuing any leases or permits. In the event that there is a known hazardous waste site present, surface occupancy will be denied.

c. Residual Impacts

See alternative A.

d. Relationship Between Short-term Uses and Long-term Productivity

e. Irreversible or Irretrievable Commitment of Resources

See alternative A.

Alternative C (Preferred Alternative) Environmental Consequences of the Preferred Alternative

The preferred alternative gives consideration to the resource values from both a State and Federal perspective but the limitations or required mitigation would not be as great as under the Alternative A. All legislative and regulatory requirements will be met as under the current management alternative; however, this alternative will not be as reactive as Alternative A. As a result of the planning process, a better decision framework will exist for future actions in the State.

Lands decisions under this alternative will be consistent with the plan and will consider the resources identified as important during the planning process. Mineral decisions will likewise be consistent with the plan and will be mitigated to protect resources identified as important in the plan.

1. Mineral Resources

1A. Mineral Development

a. Impacts

The impacts of this alternative would be less than Alternative A and greater than Alternative B. The process for mineral leasing and development outlined in Alternative A provides moderate to maximum protection depending on the resource impacted. The preferred alternative builds upon Alternative A, without being as restrictive to mineral development as Alternative B. The primary difference is that this alternative reflects areas of special concern and recommended mitigation included in this plan (see Figure 27). Specifically, mitigation has been included in this alternative to protect wintering waterfowl, threatened and endangered species, wetlands, perennial water bodies, cultural resources, and recreation areas. This allows the BLM to notify prospective lessees at the pre-lease stage of the potential for existence of sensitive resources and of the mitigation that may be required when a permit to drill is issued. As with Alterantive A, decisions of SMA's and laws or regulations protecting areas or resources will determine which areas will be available for leasing and development.

b. Mitigating Measures

Same as Alternative A.

c. Residual Impacts

Same as Alternative A.

d. Realtionship Between Short-term Uses and Long-term Productivity

Same as Alternative A.

e. Irreversible or Irretrievable Commitments to Resources

Same as Alternative A.

1B. Geologic Hazards

See discussion for Alternative A.

2. Paleontologic Resources

See discussion for Alternative A.

3. Wildlife and Threatened & Endangered Species

a. Impacts

Impacts to wildlife would be less under this alternative than alternative A, but greater than alternative B. Use of no surface occupancy stipulations, seasonal use restrictions, etc., would lessen the impacts to wildlife under this alternative.

b. Mitigating Measures

The following mitigation would be employed in addition to the mitigation outlined in alternative A.

No surface occupancy for oil and gas operations would be permitted within one quarter mile of active red-cockaded woodpecker colonies from April 1 through July 1.

A year-round no surface occupancy stipulation will be employed to protect nesting brown pelicans on Queen Bess Island.

No surface occupancy for oil and gas operations would be permitted in wetland or open water areas identified as areas of special concern for wintering waterfowl (figure 8) from October 15 through March 1.

c. Residual Impacts

Same as alternative A.

d. Relationship Between Short-term Uses and Long-term Productivity

Same as alternative A.

e. Irreversible or Irretrievable Commitment of Resources

Same as alternative A.

4. Water Resources

a. Impacts

Impacts to water resources resulting from the use of this alternative would range between Alternatives A and B The impacts are expected to be greater than B, but less than A. In no case are impacts expected to be of significant degree, or of long duration. For a discussion of the range of impacts, see the narratives for Alternatives A and B.

b. Mitigating Measures

A combination of the mitigating measures outlined in Alternatives A and B would be utilized under this alternative. The major difference would be that the NSO stipulation would not be utilized to as great an extent as discussed in B. Therefore, mitigation would be more intense in this alternative than in A, but somewhat less than B.

c. Residual Impacts

Residual impacts resulting from this alternative would range from minimal to negligible.

d. Relationship Between Short-term Use and Long-term Productivity

It is not expected that water resources would sustain any loss of either short-term use or a reduction of long-term productivity from this alternative.

e. Irreversible or Irretrievable Commitment of Resources

None of the impacts to water resources, under this alternative, are considered to be either irreversible or irretrievable.

5. Floodplains, Wetlands and Coastal Zones

a. Impacts

Impacts to wetlands, floodplains, and coastal zones would be less under this alternative than Alternative A and greater than Alternative B. Utilization of no surface occupancy stipulations, employing best available technologies, and limiting channelization wherever possible would minimize impacts from oil and gas operations under this alternative.

b. Mitigating Measures

In addition to the mitigating measures found in Alternative A, the following measures would be employed.

No surface occupancy would be allowed within 100' of any perennial streams or water bodies. Intermittent streams would be protected from surface occupancy wherever possible.

Oil and gas facilities constructed within wetland and coastal zone areas would utilize best available technology to minimize impacts to the resource. Canal construction would be prohibited where environmentally superior access methods are available. All dredge and fill operations would be minimized.

Discretionary land tenure decisions for public domain tracts containing wetlands will include patent restrictions, conservation easements, etc., to protect the wetland character of the tract. Wherever possible these tracts will be transferred to State or Federal conservation agencies.

c. Residual Impacts

See alternative A.

d. Relationship Between Short-term Use and Long-term Productivity

See alternative A.

e. Irreversible and Irretrievable Commitment of Resources

See alternative A.

6. Wild and Scenic Rivers

See discussion for Alternative A.

7. Air Quality

a. Impacts

See Alternative A.

b. Mitigating Measures

Same as Alternative A.

c. Residual Impacts

None.

d. Relationship Between Short-term Use and Long-term Productivity

All impacts are considered to be of short-term duration. Long-term productivity would not be affected.

e. Irreversible or Irretrievable Commitment of Resources

None.

8A. Soils

a. Impacts

Under this alternative, impacts to soils would range between those of Alternatives A and B. The impacts in Alternative C would be slightly larger than those anticipated under Alternative B, and slightly less than those under the No Action Alternative. The use of the No Surface Occupancy or other stipulations to protect other sensitive resources would result in less soil being disturbed by BLM permitted activities. As a result, impacts to soils would be less.

b. Mitigating Measures

A combination of the mitigating measures outlined in Alternative A and B would be enforced.

c. Residual Impacts

Due to the use of the NSO stipulation, residual impacts would be greater than Alternative B and less than Alternative A.

d. Relationship Between Short-term Use and Long-term Productivity

See Alternative A.

e. Irreversible or Irretrievable Commitment of Resources

See Alternative A.

8B. Prime and Unique Farmlands

See discussion for Alternative A.

9. Vegetation

See discussion for Alternative A.

10. Cultural Resources

a. Impacts

The impacts to the resource will be essentially the same as those described under alternative A. The BLM is, however, accepting additional responsibilities as described in the mitigation below. There will be an increased public awareness of cultural resource values. BLM decisions will be less reactive in dealing with cultural resource values. The special concern areas maps indicating sensitive cultural areas will be referred to in mineral related pre-lease and post-lease work, as well as lands casework.

b. Mitigating Measures

Same as Alternative A, except BLM will consult with the SHPO at pre-lease stage for tracts located in high priority areas (shown on figure 16). If the SHPO requests a survey, then the BLM Archaeologist will conduct a survey prior to lease issuance. Protective lease stipulations will be designed on a case-by-case basis.

c. Residual Impacts

Same as Alternative A.

d. Relationship Between Short-term Use and Long-term Productivity

Same as Alternative A.

e. Irreversible or Irretrievable Commitment of Resources

Same as Alternative A.

11. Visual Resources

a. Impacts

Impacts from this alternative would range between Alternatives A and B. Impacts will be mitigated on a case-by-case basis. For a discussion of the range of impacts, see the narratives for Alternatives A and B.

b. Mitigating Measures

Mitigating measures would include a more moderate use of the no surface occupancy stipulation, camouflage, and restricted areas for useage. Mitigation would be more intense than in Alternative A, and somewhat less intense than Alternative B.

c. Residual Impacts

After reclamation, it is not anticipated that there will be any residual impacts to the visual resources in, and surrounding, the area(s) of surface disturbance.

d. Relationship Between Short-term Use and Long-term Productivity

After production ceases and reclamation is accomplished, no impacts are anticipated.

e. Irreversible or Irretrievable Commitment of Resources

None are expected after the area of surface disturbance is reclaimed.

12. Wilderness

See discussion for Alternative A.

13. Areas of Critical Environmental Concern

See discussion for Alternative A.

14. Socio-Economics

The impacts of this alternative would be the same as under the Alternative A. This is because the process for mineral leasing and development outlined in the management common to all alternatives section provides moderate to maximum protection depending on the resource impacted.

b. Mitigating Measures

None.

c. Residual Impacts

None.

d. Relationship Between Short-term Use and Long-term Productivity

Same as Alternative A.

e. Irreversible or Irretrievable Commitment to Resources

Same as Alternative A.

15. Recreation

a. Impacts

Under this alternative, mineral actions in areas with recreation resources would include protective stipulations. P.D. land with recreation potential would be considered for R&PP transfers. These actions would minimize the potential for negative impacts to recreation areas.

b. Mitigating Measures

The same mitigation measures described under the first two alternatives will be used to provide moderate protection on a case-by-case basis.

c. Residual Impacts

See discussion for Alternative A.

d. Relationship Between Short-term Use and Long-term Productivity

See discussion for Alternative A.

e. Irreversible or Irretrievable Commitment to Resources

See discussion for Alternative A.

16. Transportation

See discussion for Alternative A.

17. Hazardous Waste

See discussion for Alternative A.

Appendix 1

STANDARD OPERATING PROCEDURES FOR THE MANAGEMENT OF FLUID MINERALS

STANDARD OPERATING PROCEDURES FOR THE MANAGEMENT OF FLUID MINERALS

Private industry is encouraged to explore and develop Federal minerals to satisfy national and local need. This policy provides for economically and environmentally sound exploration, extraction and reclamation practices. Public lands are open and available for mineral exploration and development unless withdrawn or administratively restricted. Mineral development may occur along with other resources uses. Programs to obtain and evaluate current energy and mineral data are encouraged.

In general, the BLM has approval authority concerning oil and gas activities in two basic situations. First, when the activities involve drilling or production of oil and/or gas from Federal Mineral Ownership (FMO) regardless of surface ownership and second when such activities occupy Public Domain (PD) surface regardless of mineral ownership. In the first category approvals are granted through various mineral leasing acts and require consultation with the appropriate Surface Management Agency (SMA). In the second case approvals are granted through right of way regulations.

This section has been prepared to provide the reader a better understanding of some of the key standard methods and practices used to protect the environment during development of oil and gas resources. The contents should be viewed as a general overview and not as a detailed statement of the standards and procedures. Such details are appropriately contained in various orders and regulations.

This document is divided into four parts. Each part covers one of four basic phases of oil and gas development. Part One describes geophysical operations. Part Two covers drilling operations. Part Three covers production operations and Part Four covers well abandonment and reclamation. Within each part the subject is divided into three sections. The first of these provides a general description of the the subject phase of operation. The second section outlines the standard procedural practices used by BLM to approve each phase. The third section describes some of the more common design and operation standards associated with oil and gas operations that the Jackson District considers acceptable standard practices under normal conditions.

Part 1. Geophysical Operations

A. General Description of Geophysical Operations

Three subsurface characteristics are usually measured by geophysical methods: gravitational field, magnetic field, and seismic characteristics.

Gravity and Magnetics

Gravitational and magnetic surveys involve small portable units that are easily transported via light ground vehicles such as four-by-four pickups and jeeps (some units are airborne). Off-road vehicle traffic is common in these two types of surveys. Sometimes small holes (approximately 1 foot by 2 feet) are hand dug for instrument placement along the survey lines.

Seismic

Seismic lines are the most popular of the geophysical methods and seem to give the most reliable results. A seismic survey is a method of gathering subsurface geological information by recording impulses from an artificially generated shock wave. The common procedure used in reflection seismic surveys on land consists of creating shock waves and recording, as a function of time, the resultant seismic energy as it arrives at groups of vibration detectors (1/2 to 5 pound seismometers, or jugs, arrayed on the ground at spaced intervals). These arrays of seismometers are connected to a recording truck that receives and records the reflected seismic energy.

The seismic sensors and energy source are located along lines on a 1 to 2 mile grid. Some surveys may be laid out in excess of 40 miles in a series of grid patterns or in a single line.

Where possible, existing roads are used to conduct seismic operations. Some lines may require clearing of vegetation and loose rock to improve access for trucks. Each mile of line cleared to a width of 8 to 14 feet represents disturbance of about an acre of land.

In remote areas where little is known about the subsurface, a series of short seismic lines may be required to determine the attitude of the subsurface formations. After this, seismic lines will be aligned to make seismic interpretation more accurate.

Seismic methods are usually referred to by the various methods of generating the shock wave. A given area may be explored with seismic methods several times by the same or different companies over a long period of time. The following are some of the more common methods. Methods a, b, and c have similar surface disturbing factors. Generally the methods involve travel either on existing roads or off-road with 4 to 5 energy source trucks (usually weighing 2-1/2 to 10 tons) plus the recording truck and cable trucks or pickups. The vehicles may travel off road along a single two lane trail made by the truck as the survey progresses. The vehicle may make several parallel trails in an attempt to distribute travel loads over a broader area. Travel along the line is usually a matter of 1 to 2 passes by the vehicles since the energy source is mobile and recording is done as the vehicles move down the line.

a. Thumpers

   The thumper method involves dropping a steel slab weighing about 3 tons to the ground several times in succession along a predetermined line. The weight is attached by cables to a crane on a special truck.

b. Vibroseis. The vibrator (or vibroseis) method is widely used and is replacing the explosive method in accessible areas. A typical operation would use three or four large trucks or tractors each equipped with a vibrator mounted between the front and back wheels; four or five support vehicles; and a crew of 10 to 15 people. The vibrator pads (about 4 feet square) are lowered to the ground and vibrators on all trucks are triggered electronically from the recorder truck. After the information is recorded, the trucks move forward a short distance and the process is repeated.

c. Dinoseis. The dinoseis method can be used with a variety of vehicles. Its device consists of a bellshaped chamber mounted underneath a vehicle. The seismic energy is imparted to the ground through the spark ignition of a propane and oxygen mixture confined in the chamber. This method causes little surface damage.

d. Explosives. Historically, explosives have been the most widely used way to generate seismic shock waves. The explosives can be detonated either through subsurface and surface techniques.

In the subsurface explosive method, 5 to 20 pounds of explosive charge are detonated at the bottom of a 25 to 200 foot drill hole. The hole is usually 2 to 6 inches in diameter and drilled with a truck-mounted rig. Detonation of the charge in some areas causes no surface disturbance while in other areas a small crater up to 6 feet in diameter is created. Cuttings from he shot hole are scattered by hand near the hole, or put back in the shot hole. The same hole may be reloaded and shot several times.

Drilling and shooting are similar to vibroseis and thumpers in that the rig is transported by truck. However, the trucks used in drilling are usually heavier (15 to 20 tons). As with other truck transported operations, existing roads may be used or trails may be blazed by the drill vehicles and/or a bulldozer. Truck-mounted drill and shot operations generally take longer to complete and require more disturbance than thumper operations. The reason for this is that the holes must be drilled, charged, and shot along a relatively long distance compared to vibroseis and thumpers.

Where access limitations, topography, or other restraints prevent use of truck-mounted drill rigs or recording trucks, light weight portable drill equipment can be used. Various kinds of portable drills can be backpacked or delivered by helicopter to the area. These portable operations use a pattern of holes drilled to a depth of about 25 feet. The holes are loaded with explosives and detonated simultaneously.

The surface explosive charge method involves the placing of explosives directly on the ground or on a variety of stakes and platforms. Paper cones, survey stakes, lathes, or 2 X 4's up to 8 feet in length have been used with varying success in different areas.

Surface explosive methods are very mobile. Generally 4 X 4 pickups are used for transportation, although the method is adaptable to airborne and pack teams.

B. Procedural Practices for Geophysical Operations

The oil and gas lease does not include the right to conduct geophysical operations. BLM has jurisdiction over approval of such operations only on Public Domain surface. For lands other than Public Domain approval is obtained from the land owner. In the east very little Public Domain surface exists. Consequently, requests for approval of geophysical operations are rare. The procedures are addressed in CFR Part 3040. The procedures involve filing of a Notice of Intent to Conduct Oil and Gas Exploration Operations. The completion and signing of the notice signifies agreement to comply with the terms and conditions of the notice.

C. Design and Operation Standards for Geophysical Operations

Upon completion of the operation the applicant shall file a Notice of Completion of Oil and Gas Exploration Operations. Within 30 days after the filing the applicant will be notified by BLM and advised as to whether or not the terms of the notice of intent have been met and whether any additional reclamation is required. Standard reclamation practices include filling the shot holes, general cleanup, repair of structures such as fences and seeding disturbed areas as needed.

Part 2. Drilling Operations

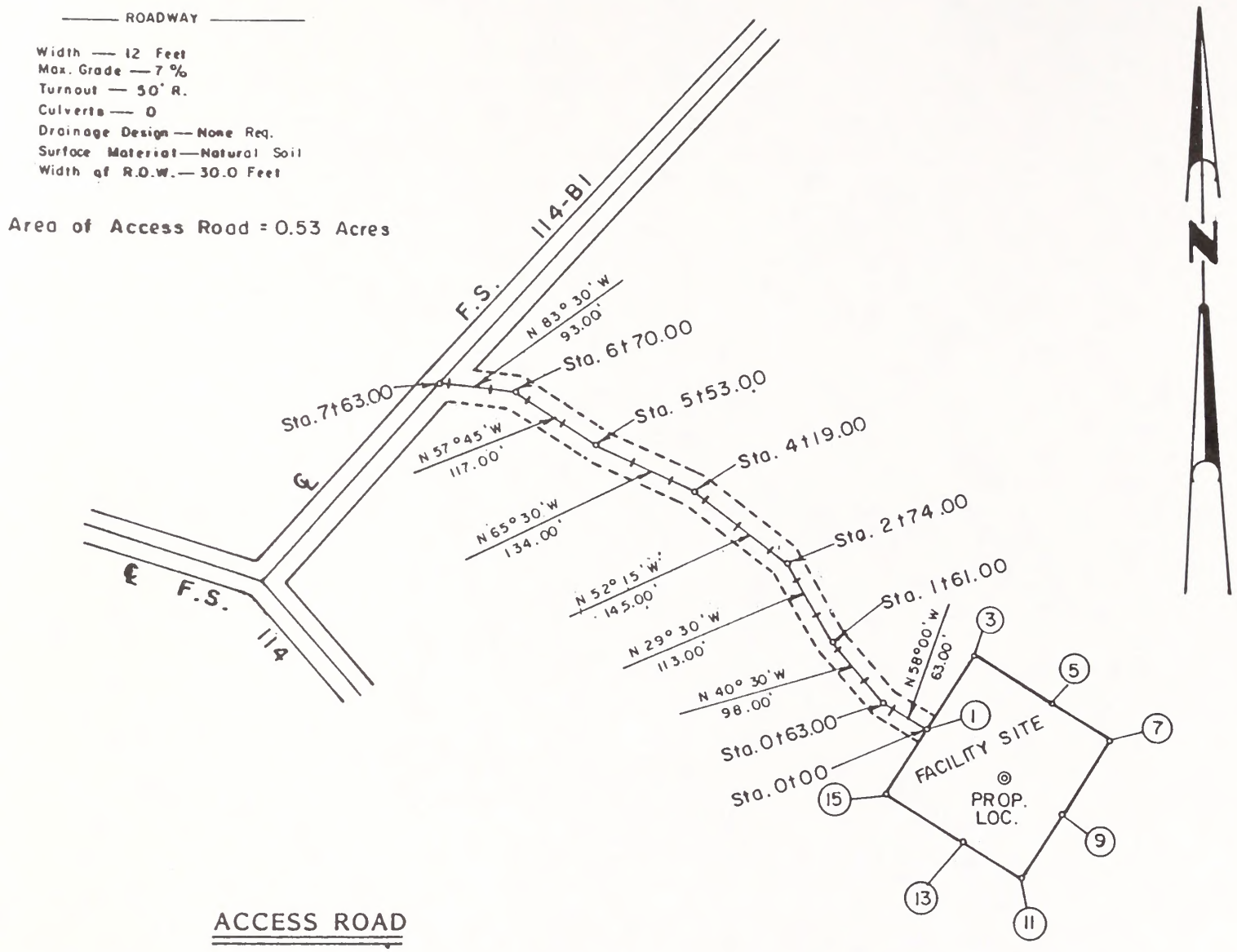
A. General Description of Drilling Operations

After completing the necessary permitting procedures, construction of the access road and well site can begin. The equipment generally includes bulldozers, backhoes, and motor graders. Existing roads may need improvements, including crowning and ditching, surfacing, etc. New roads are usually constructed with a 12 to 14 foot wide travel way and a 30 foot right of way. Figure No. 1 shows an example of a typical access road. The amount of surface disturbance from road construction is often significantly greater on steep slopes due to steeper cut and fill slopes.

The size and shape of the well site varies with the depth of the well and the topography. In general, deeper wells require larger drill rigs, and larger well sites. On relatively level surface the well site is typically square and ranges in size from 100 feet by 100 feet to 450 feet by 450 feet. The average size is 250 feet by 250 feet. The site is first cleared of vegetation, and then leveled. Figure No. 2 shows an example of a typical well site.

A reserve pit to contain waste drilling fluids and drill cuttings is constructed within the well site along one side of the leveled area. The dimensions of the pit will vary with the depth of the well, and the method of drilling. Deep wells and mud drilled wells usually require a larger reserve pit than shallow wells, and air drilled wells. A typical reserve pit is 40 feet by 150 feet and 6 feet in depth.

The pit may be lined with bentonite to prevent leakage. The drill rig is usually moved on site within one or two weeks after site construction. Several truck loads are required to move the rig sections.



ACCESS ROAD

STATIONS	ELEVATIONS
0+00	440.3
0+50	442.8
0+63.00	444.4
1+00	444.5
1+50	445.4
1+61.00	445.7
2+00	446.5
2+50	447.2
2+74.00	447.4
3+00	446.9
3+50	446.7
4+00	446.9
4+19.00	448.4
4+50	448.9
5+00	449.9
5+53.00	451.3
6+00	453.1
6+50	454.7
6+70.00	455.8
7+00	456.9
7+50	457.1
7+63.00	457.3

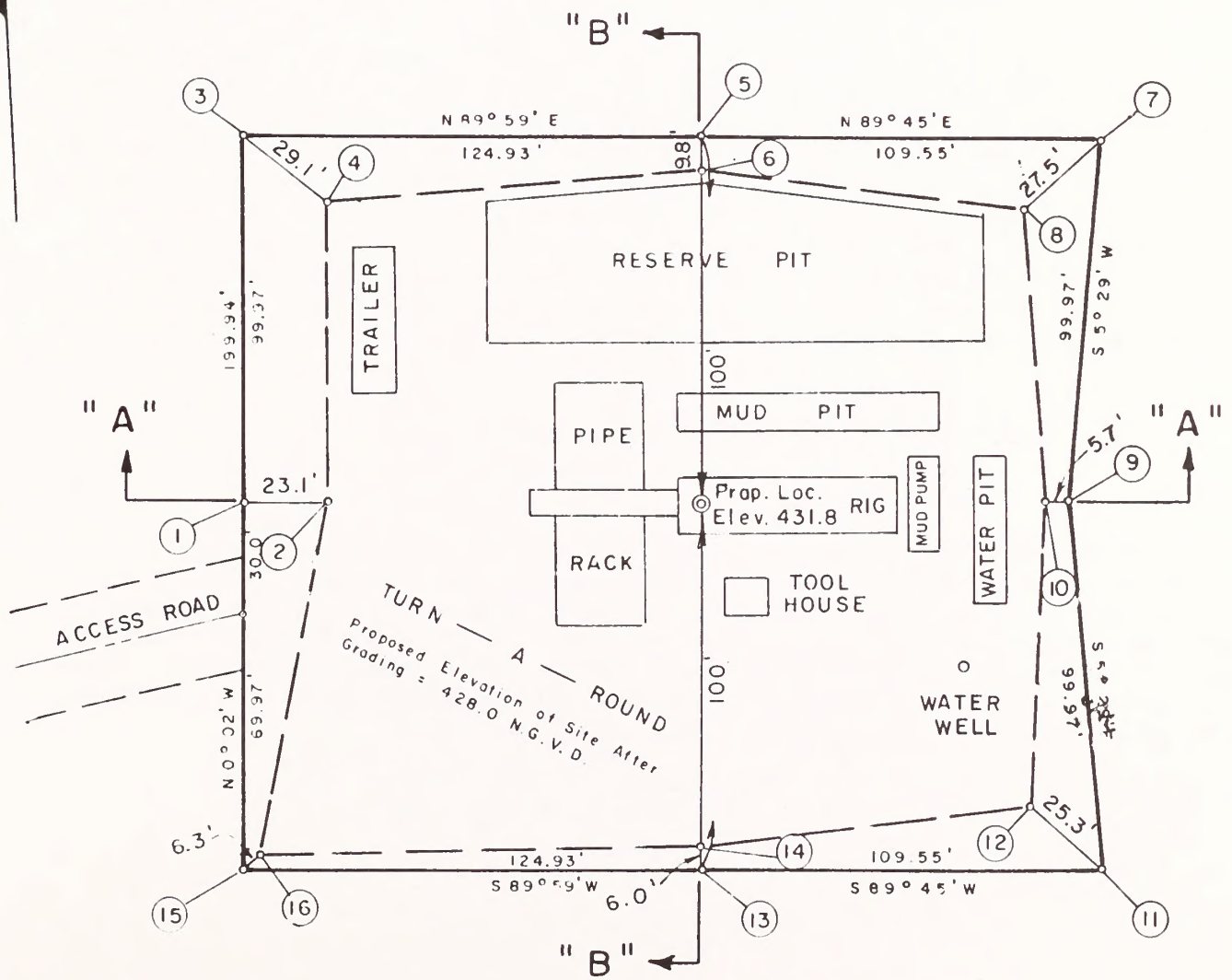
Figure No. 1

1" = 200'

1. Elevations Shown are N.G.V.D.
2. Solid Line Indicates Perimeter of Facility Site, Marked by Stakes with Pink Flagging & Corresponding Nos.
3. Dashed Line Indicates Perimeter of Graded Site, Marked by Stakes with Blue Flagging & Corresponding Nos.
4. (3) Indicates Tabulated Elevations.
5. All Slopes are 3:1 (Minimum) & Distances Shown are Slope Distances.
6. See Sheet 2 for Cross Sections of Facility Site.
7. See Sheet 3 for Cross Sections of Pits.
8. Area of Facility Site = 1.05 Acres.

FACILITY SITE ELEVATIONS

1.	435.3	2.	434.9	Cut	6.9
3.	437.2	4.	436.3	Cut	8.3
5.	431.1	6.	431.7	Cut	3.7
7.	419.3	8.	421.3	Fill	6.7
9.	426.2	10.	426.9	Fill	1.1
11.	420.0	12.	424.7	Fill	3.3
13.	426.1	14.	426.4	Fill	1.6
15.	426.0	16.	426.5	Fill	1.5



1" = 50'

Figure No. 2

Drilling is normally accomplished by rotating a bit at the end of the drill string under pressure. Figure No. 3 is a general diagram of a typical rig. The rig heigth is approximately 150 feet. As the bit cuts into the rock, the cuttings are pushed up the hole by compressed air (air drilling) or a mixture of water, clay, and chemical additives (mud drilling). Some mud additives are caustic, toxic, or acidic, but such additives are not always used. When used, additives constitute an extremely small portion of the total mud volume. The air or mud is pumped down the drill pipe, exists through holes in the bit, and returns to the surface outside the drill pipe. Cuttings, contaminated mud, and waste drilling fluids are contained in the reserve pit. The hole is cased with steel pipe and cemented into place. Casing and cementing prevents caving of the hole, seals off other formations and protects ground water aquifers.

Drilling operations are continuous, 24 hours a day and 7 days a week. Drilling usually lasts from 2 to 30 days, depending upon well depth and problems encountered.

From 5,000 to 15,000 gallons of water a day may be needed for mixing drilling mud, cleaning equipment, cooling engines, etc. A surface pipeline may be laid to a stream or a water well, or the water may be trucked to the site from creeks, ponds or streams in the area.

When total depth of the well is reached one or more of the following completion operations must be conducted in most wells: (1) logging, which measures porosity, permeability, and saturation of the formation, (2) drill stem testing, which allows production through the stem for accurate production measures, (3) installing and perforating the production casing to allow production of the formation, and (4) formation stimulation, which is usually fluid fracture or acid dissolving of the formation to increase the flow capacity of the formation. If producible oil and gas is discovered, the well will be shut in until production facilities are installed. If producible amounts of oil and gas are not encountered, the well will be plugged and abandoned.

B. Procedural Practices for Drilling Operations

Leasing

Prior to any operations the property must be leased. BLM administers the leasing of onshore oil and gas on public domain and acquired lands. Onshore oil and gas leasing for most public domain and acquired lands is authorized under the Mineral Leasing Act of 1920 and the Mineral Leasing Act for Acquired lands of August 7, 1947. Certain lands are excluded from leasing under these Acts for a variety of reasons including environmental conflicts, national defense or authority granted under other acts.

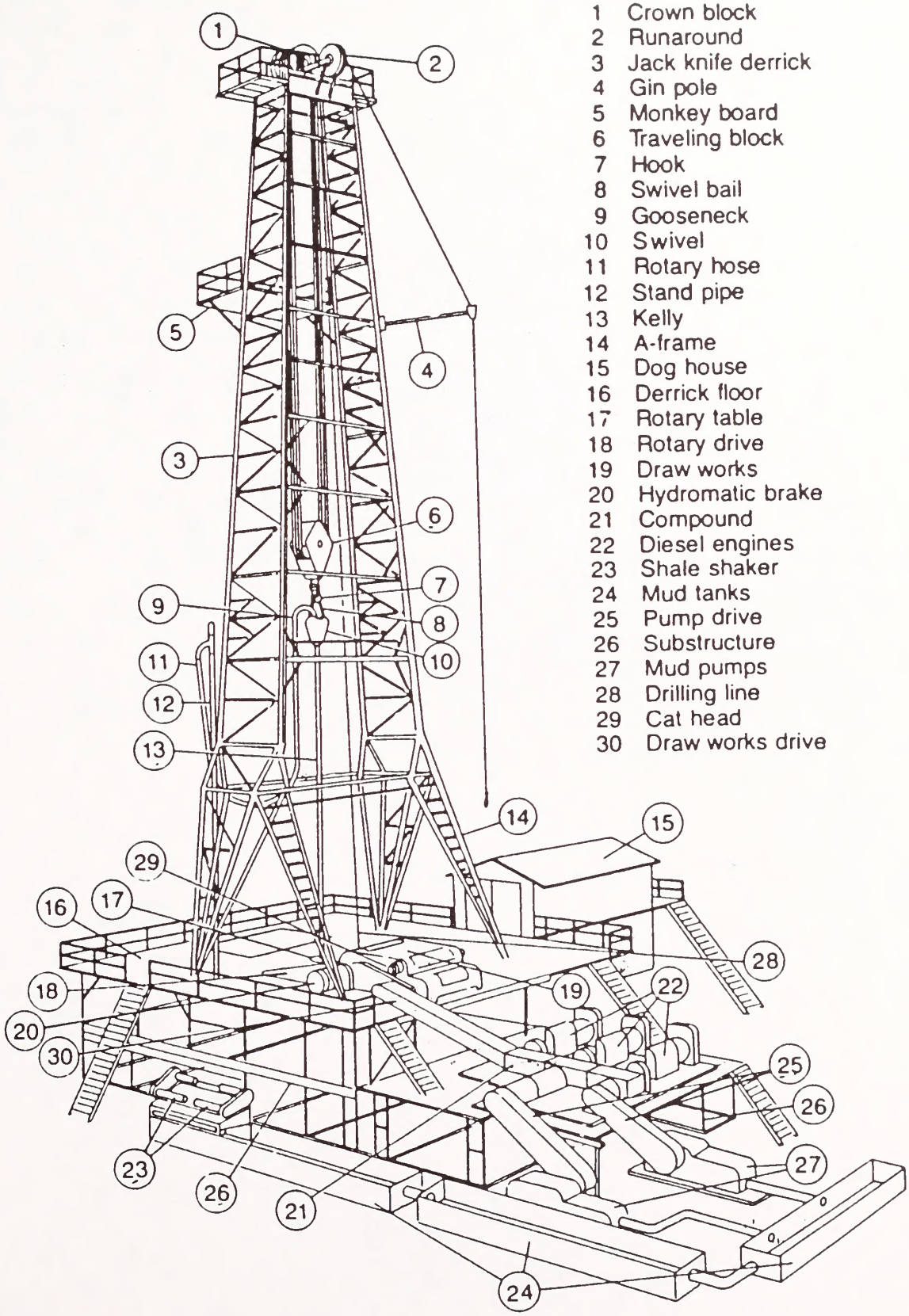

1 Crown block
2 Runaround
3 Jack knife derrick
4 Gin pole
5 Monkey board
6 Traveling block
7 Hook
8 Swivel bail
9 Gooseneck
10 Swivel
11 Rotary hose
12 Stand pipe
13 Kelly
14 A-frame
15 Dog house
16 Derrick floor
17 Rotary table
18 Rotary drive
19 Draw works
20 Hydromatic brake
21 Compound
22 Diesel engines
23 Shale shaker
24 Mud tanks
25 Pump drive
26 Substructure
27 Mud pumps
28 Drilling line
29 Cat head
30 Draw works drive

Figure No. 3

Oil and gas on public domain lands and lands returned to the public domain are subject to lease under the Mineral Leasing Act of 1920, as amended and supplemented (30 U.S.C. 181 et seq.), by acts including, but not limited to, section 1009 of the Alaska National Interest Lands Conservation Act (16 U.S.C. 3148). Exceptions to this authority are as follows:

(a) National parks and monuments, including lands withdrawn by section 206 of the Alaska National Interest Lands Conservation Act;

(b) Indian reservations;

(c) Incorporated cities, towns and villages

(d) Naval petroleum and oil shale reserves and the National Petroleum Reserve--Alaska.

(e) Lands north of 68 degrees north latitude and east of the western boundary of the National Petroleum Reserve--Alaska; and

(f) Arctic National Wildlife Refuge in Alaska.

Oil and gas in acquired lands are subject to lease under the Mineral Leasing Act for Acquired Lands of August 7, 1947, as amended (30 U.S.C. 35-359). Exceptions to this authority are:

(a) National parks and monuments;

(b) Incorporated cities, towns and villages;

(c) Naval petroleum and oil shale reserves and the National Petroleum Reserve--Alaska;

(d) Tidelands or submerged coastal lands within the continental shelf adjacent or littoral to lands within the jurisdiction of the United States;

(e) Lands acquired by the United States for development of helium, fissionable material deposits or other minerals essential to the defense of the country, except oil, gas and other minerals subject to leasing under the Act;

(f) Lands reported as excess under the Federal Property and Administrative Services Act of 1949; and

(g) Lands acquired by the United States by foreclosure or otherwise for resale.

Were oil or gas is being drained from lands otherwise unavailable for leasing, there is implied authority in the agency having jurisdiction of those lands to grant authority to the Bureau of Land Management to lease such lands (see 43 U.S.C. 1457; also Attorney General's Opinion of April 2, 1941 (Vol. 40 Op. Atty. Gen. 41)).

Where lands previously withdrawn or reserved from the public domain are no longer needed by the agency for which the lands were withdrawn or reserved and such lands are retained by the General Services Administration, or where acquired lands are declared as excess to the General Services Administration, authority to lease such lands may be transferred to the Department in accordance with the Federal Property and Administrative Services Act of 1949 and the Mineral Leasing Act for Acquired Lands, as amended.

The Act of May 21, 1930 (30 U.S.C. 301-306), authorizes the leasing of oil and gas deposits under certain rights-of-way to the owner of the right-of-way or any assignee.

Prior to December 22, 1987 BLM issued onshore oil and gas leases under these Acts on both a competitive and non-competitive basis. The determination as to which method to use was based on the BLM's geologic evaluation of a proposed lease area.

However on December 22, 1987 the House and Senate approved the budget reconciliation bill containing an amendment to the Mineral Leasing Act of 1920 known as the the Federal Onshore Oil and Gas Leasing Reform Act of 1987 (Reform Act).

As a result of the Reform Act all lands must be exposed to competitive interest for a legislated minimum $2.00 per acre bid. Lands which do not receive competitive interest are available for non-competitive leasing for a period not to exceed two years. Parcel size may not exceed 2,560 acres in the lower 48 States and 5,760 in Alaska. Royalty rate will be 12 1/2% for both competitive and non-competitive leases and rental will be $1.50 per acre for the first five years and $2.00 per acre thereafter for all leases.

Sales are held on a quarterly basis in States where eligible lands are available and public notice is provided 45 days prior to offering lands for lease and 30 days prior to approving an Application for Permit to Drill (APD).

Leases may not be issued or assignments approved to parties who have failed to properly reclaim a leasehold.

Federal oil and gas leases include standard lease terms many of which are designed to protect affected resources. The standard terms are specified in the lease instrument (Exhibit No. 1). Such terms include the following:

Sec. 6. Conduct of operations--Lessee shall conduct operations in a manner that minimizes adverse impacts to the land, air, and water, to cultural, biological, visual, and other resources, and to accomplish the intent of this section. To the extent consistent with lease rights granted, such measures may include, but are not limited to, modification to siting or design of facilities, timing of operations, and specification of interim and final reclamation measures. Lessor reserves the right to continue existing uses and to authorize future uses upon or in the leased lands, including the approval of easements or rights-of-ways. Such uses shall be conditioned so as to prevent unnecessary or unreasonable interference with rights of lessee.

Prior to disturbing the surface of the leased lands, lessee shall contact lessor to be appraised of procedures to be followed and modifications or reclamation measures that may be necessary. Areas to be disturbed may require inventories or special studies to determine the extent of impacts to other resources. Lessee may be required to complete minor inventories or short term special studies under guidelines provided by lessor. If in the conduct of operations, threatened or endangered species, objects of historic or scientific interest, or substantial unanticipated environmental effects are observed, lessee shall immediately contact lessor. Lessee shall cease any operations that would result in the destruction of such species or objects.

Sec. 7. Mining operations - To the extent that impacts from mining operations would be substantially different or greater than those associated with normal drilling operations, lessor reserves the right to deny approval of such operations.

Sec. 9. Damages to property - Lessee shall pay lessor for damage to lessor's improvements, and shall save and hold lessor harmless from all claims for damage or harm to persons or property as a result of lease operations.

Sec. 12. Delivery of premises - At such time as all or portions of this lease are returned to lessor, lessee shall place affected wells in condition for suspension or abandonment, reclaim the land as specified by lessor and, within a reasonable period of time, remove equipment and improvements not deemed necessary by lessor for preservation of producible wells.

These terms are by necessity very general and site specific conditions are often needed. Such site specific conditions are referred to as special stipulations and are developed to respond to specific environmental concerns for a particular lease. Special stipulations are developed by the appropriate SMA and BLM. Special lease stipulations limit the lessee's use of the lease. Examples are when portions of the lease cannot be occupied due to resource conflicts such as the presence of archeological sites, residential areas, threatened or endangered species etc, or cannot be used during certain parts of the year for wildlife, watershed, conflicting land use or other reasons. Special stipulations are attached to the lease instrument. Such stipulations are identified through a review process consistent with the National Environmental Policy Act (NEPA). This process involves analyzing the environmental parameters of the lease area in order to identify environmental conflicts that may exist and a determination as to the significance of any conflicts. This process is documented in an appropriate environmental document and ultimately leads to a decision to allow or deny the lease and if so under what conditions.

Application for Permit to Drill

Onshore oil and gas operations are subject to federal regulations contained in Title 43 CFR Part 3160, "Onshore Oil and Gas Operations" (Exhibit No. 2). After lease issuance and prior to approval of any drilling activities within the area of the lease, the operator must submit an Application for Permit to Drill (APD) as required by Onshore Oil and Gas Order No. 1. The APD provides operational and geologic information as well as the applicants proposal for use of the surface. Bonding coverage must be obtained by the applicant before approval and the applicant must either have record title, operating rights or be designated operator by the individuals having authority make such designations.

The applicants proposal for use of the surface is provided in the APD per submittal of a Surface Use and Operations Plan. This plan provides a detailed description of the existing roads, proposed access road location and design, location of existing wells, proposed production facilities, water supply, construction materials, waste disposal, ancillary facilities, well site layout, plans for surface reclamation, surface ownership, lessee's or operators representative and any other additional information that may be helpful in processing the APD. Where private surface is involved, the plan includes a copy of the written agreement between the lessee or operator and the surface owner. A letter from the lessee or operator setting forth reclamation requirements agreed to with the surface owner is acceptable. The preparer is required to certify that the information in the surface use plan is to the best of their knowledge true and correct. The surface use plan is one of the items used to evaluate the environmental impacts of the proposal.

A site-specific and field examination of the proposed drill site and access road is conducted by BLM and other interested parties. Other participants normally attending the inspection include the SMA for federal surface, the appropriate State agency on State lands, the surface owner on private lands, the operator, drilling contractor, dirt contractor and any other interested parties. From this effort, site-specific requirements are formulated for the protection of the affected resources. Although BLM has prime responsibility at this point, it must have full concurrence from any other surface managing agency. If differences exist, these are forwarded through various administrative levels and eventually to the Secretary.

The environmental impacts of the proposed drilling operation are assessed through the preparation of an appropriate environmental document as required by NEPA. As part of the review process State and federal agencies possessing special expertise in the management of a particular resource are consulted in order to obtain their advise as to the impact of the proposal to a specific resource. Examples of agencies consulted include the U.S. Fish and Wildlife Service concerning threatened or endangered species and the State Historic Preservation Officer concerning cultural resources.

The Permit contains standard stipulations as shown in Exhibit No. 3. The surface use plan, onsite inspection and consultation are used collectively to assess the impacts. BLM also includes site specific surface and subsurface stipulations in the approved permit. In addition, recommendations submitted by the SMA in their letter of concurrence is normally attached as conditions of the Permit.

C. Design and Operation Standards for Drilling Operations

Survey Standards

Staking includes the well location, two 200-foot directional reference stakes, the exterior dimensions of the drill pad, reserve pit, other areas of surface disturbance, cuts and fills, and centerline flagging of new roads with road stakes being visible form one to the next. Cut and fill staking is required for the well site, reserve pit, and any ancillary facilities. Slope staking may subsequently be required for road locations on steep terrain, stream crossings, and for other environmentally sensitive locations. Figures No. 1 and 2 are typical survey diagrams of the well pad and access road.

Well Site

Well sites should be located on the most level location available that will accommodate the intended use. The site layout should be oriented to conform to the best topographic situation given the geologic target and any safety considerations. However, safety considerations may be an overruling factor (such as operations in a hydrogen sulfide area). Steeply sloping locations which require deep nearly vertical cuts and steep fill slopes should be avoided. Generally, cut and fill slopes on the perimeter of the well pad are not to exceed 3:1 (one foot verticle for three foot horizontal). The location of the well site should also be selected considering the effect upon the location of the access road. Advantages gained on a good well site or tank battery location may be negated by adverse effects of the access road location.

Construction procedures must conform to the approved surface use plan. Generally, all surface soil materials shall be removed from the entire construction site, including the fill area, and stockpiled. The depth of topsoil to be stripped and stockpiled should be determined at the pre-drill inspection and/or stated in the proposed surface use plan. Surface soil material stockpiles should be located to avoid mixing with subsurface materials during construction and reclamation. Stockpile locations should be located so wind and water erosion are minimized.

Normally, excavation of the cut and fill slopes is guided by information on the slope stakes. Fills should be compacted to minimize the chance of slope failure. If appropriate, terraces can be used on cut and fill slopes to reduce land impacts, such as length of slope, to prevent excessive water accumulation and erosion. If excess cut material exists after fill areas have been brought to grade, the excess material may be disposed of or stockpiled at approved locations.

The area of the well pad that supports the drilling rig substructure must be level and capable of supporting the rig. Ideally, the rig should be located on cut material (see Figure No. 4). The drill rig, tanks, heater treater, etc., are not to be placed on uncompacted fill material. The area used for mud tanks, generators, mud storage, and fuel tanks, etc., should be slightly sloping to provide surface drainage from the work area. Such drainage should be diverted into the reserve pit. Runoff water from offsite areas should be diverted away from the well site by ditches, waterbars, or terraces above and below the cut slopes.

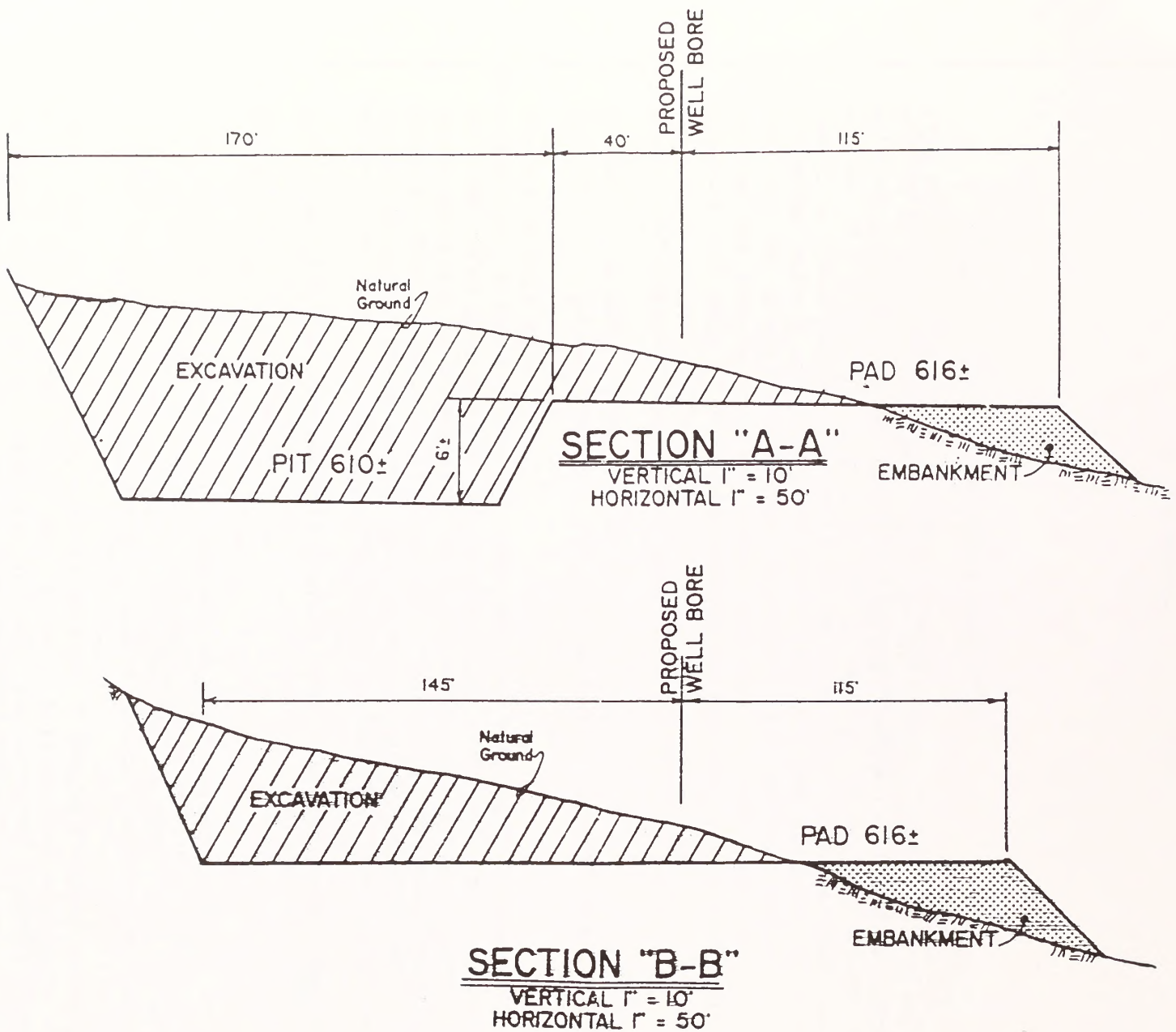

PROPOSED WELL BORE
170'
40'
115'
Natural Ground
EXCAVATION
PIT 610±
6'±
PAD 616±
EMBANKMENT
SECTION "A-A"
VERTICAL 1" = 10'
HORIZONTAL 1" = 50'
PROPOSED WELL BORE
145'
115'
Natural Ground
EXCAVATION
PAD 616±
EMBANKMENT
SECTION "B-B"
VERTICAL 1" = 10'
HORIZONTAL 1" = 50'

Figure No. 4

Reserve pits are normally a part of a well site and are used for storage or disposal of water, drill mud, and cuttings. Pits improperly constructed on slopes may leak along the plane between the natural ground level and the fill. There is a significant potential for pit failure in these situations. The reserve pit should be located as much as possible in cut material. On steep slopes, this may not be entirely possible. In such cases, at least 50 percent to the reserve pit should be constructed below original ground level to prevent failure of the pit dike. Fill dikes must be compacted. The necessary degree of compaction depends on soil texture and moisture content.

It may be necessary to line reserve pits to prevent contamination of ground water and soil. Bentonite is most commonly used. In some environmentally sensitive areas, self-contained mud systems instead of reserve pits may be required with the drilling fluids, mud and cuttings being transported to approved offsite disposal areas. Reserve pits and/or well pads and access roads have to fenced and/or flagged to prevent access to wildlife or livestock.

Special construction techniques are required in unique environmental settings. Among these include wetlands. In wetlands such techniques may include elevating and boarding of the road and/or well site, construction of a ring levee around the well site and use of tanks instead of pits.

Access Roads

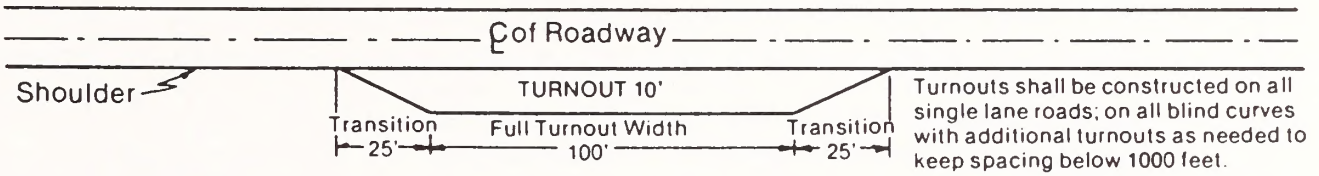
Figure No. 5 shows profiles of a typical roads used for oil and gas operations.

Access roads for oil and gas operations are generally low volume, single-lane roads, which may be reclaimed after a particular use terminates. These roads normally have a 12-14 foot travelway. For drilling phases, in many cases these roads may be constructed for dry weather use and not require surfacing. In some cases and during wet seasons the road must be surfaced. Should production be established the road must be surfaced, drained and maintained for all weather use.

Drainage must be provided for the entire road. Usually this is accomplished by use of drainage ditches and culverts.

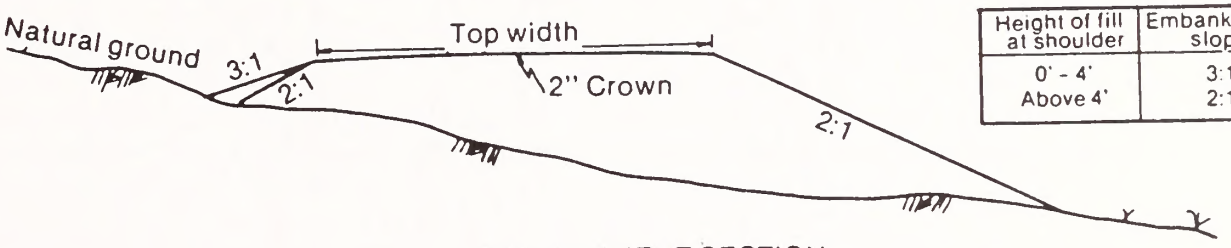
Normal road gradients should not exceed 8 percent.

Culverts are used in two applications on oil and gas access roads; (1) in streams and gullies to allow normal drainage to flow under the traveled way, and (2) to drain inside road ditches. The typical culvert design and placement details are given in Figure No. 6. The location of each culvert should be shown on the plan and profile or similar drawings submitted with the surface use plan. All culverts should be laid on natural ground or at the original elevation of any drainage crossed. Culverts should be placed on a 3 percent minimum grade. The outlet of all culverts should extend at least one foot beyond the toe of any slope.



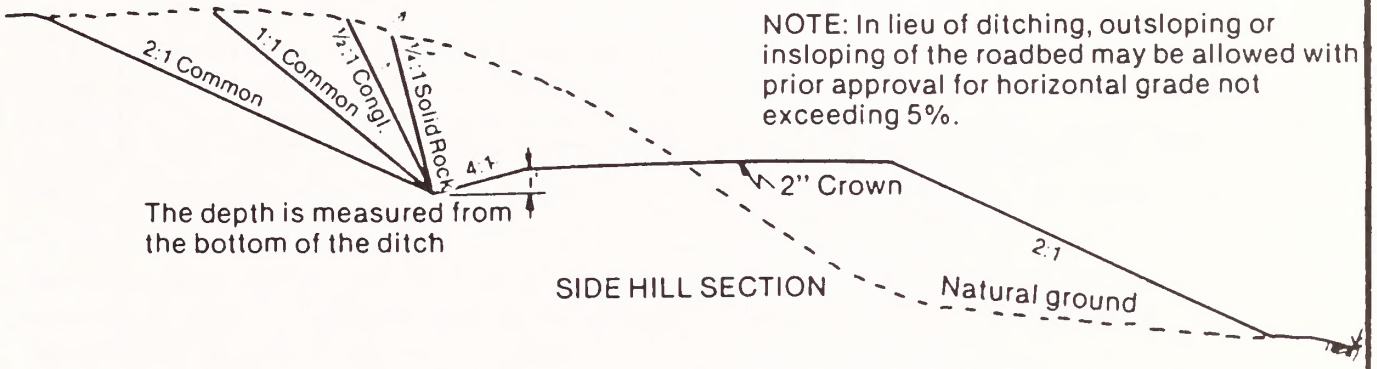
Turnouts shall be constructed on all single lane roads; on all blind curves with additional turnouts as needed to keep spacing below 1000 feet.

TYPICAL TURNOUT PLAN



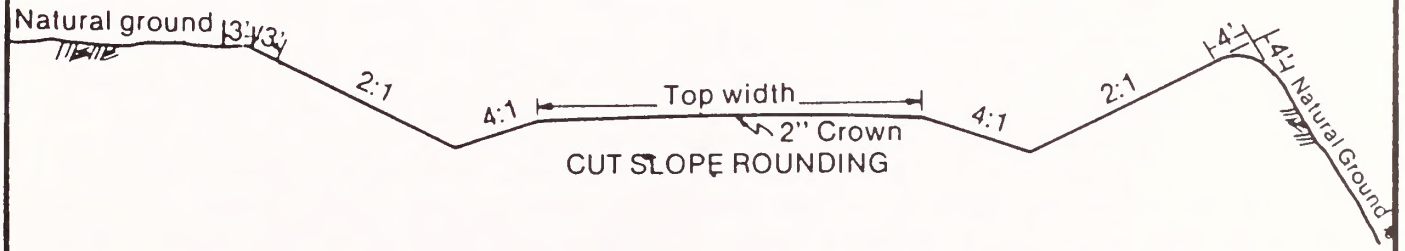
Height of fill at shoulder	Embankment slope
0' - 4'	3:1
Above 4'	2:1

EMBANKMENT SECTION

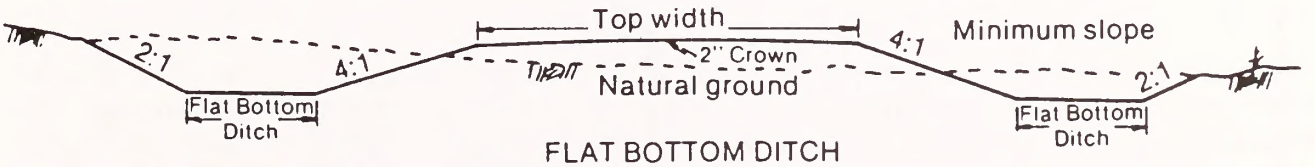


NOTE: In lieu of ditching, outsloping or insloping of the roadbed may be allowed with prior approval for horizontal grade not exceeding 5%.

SIDE HILL SECTION

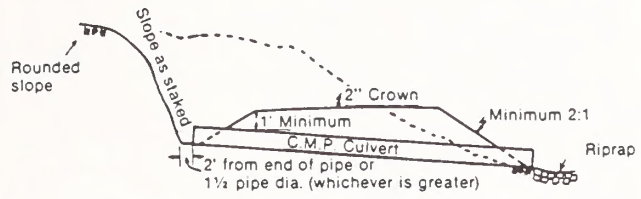


CUT SLOPE ROUNDING

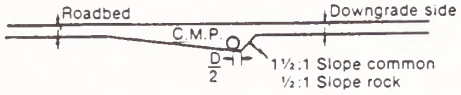


FLAT BOTTOM DITCH

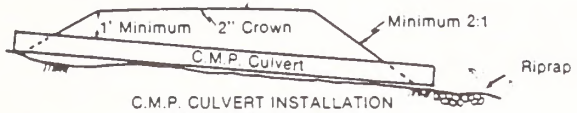
Figure No. 5



C.M.P. CULVERT INSTALLATION



DITCH CONSTRUCTION AT SIDE HILL
C.M.P. CULVERT INSTALLATION

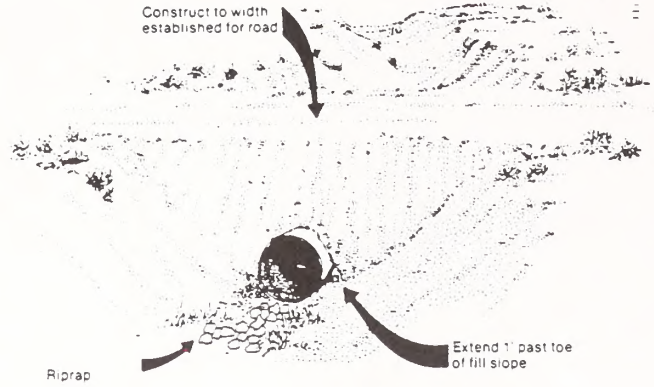


C.M.P. CULVERT INSTALLATION
EMBANKMENT SECTION

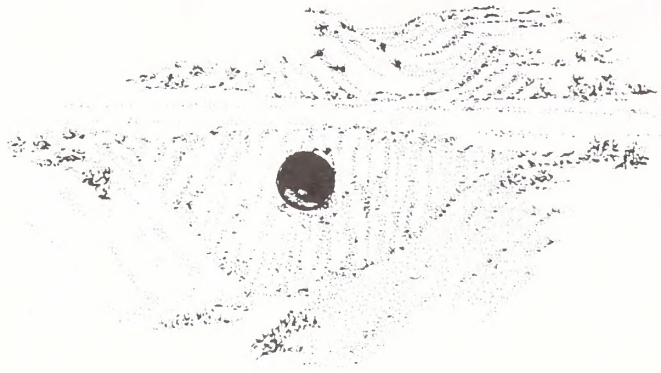
General Notes:

1. In bedding of C.M.P. Culverts, if the foundation is rock, excavate to depth of 8 in. below culvert grade and replace with earth cushion.
2. Minimum cover over culvert is one foot (1').
3. Minimum culvert diameter 18".
4. Minimum culvert spacing:
   (a) 1- 2% grade — 1000 feet minimum
   (b) 2- 4% grade — 800 feet minimum
   (c) 4- 6% grade — 600 feet minimum
   (d) 6- 8% grade — 400 feet minimum
   (e) 8-10% grade — 250 feet minimum
5. Maximum grade 10%.

Figure No. 6



ACCEPTABLE



NOT ACCEPTABLE

Wetlands are especially sensitive areas. Generally, these areas require crossings which prevent unnatural fluctuations in water level. Marshy and swampy terrain may contain bodies of water with no discernible current. The design of culverts for roads crossing these locations requires some unique considerations. The culvert should be designed with nearly a flat grade so water can flow either way and maintain its natural water level on both sides. It may be partially blocked by aquatic growth and installed with the flow line below the standing water level at its lowest elevation. Special attention must be given to the selection of culvert materials that will resist corrosion.

Roads commonly cross small drainages and intermittent streams. Here culverts and bridges are usually unnecessary. The crossing can be effectively accomplished by dipping the road down to the bed of the drainage. Material moved from the banks of the crossing should be stockpiled near the right-of-way. Gravel, riprap, or concrete bottoms may be required in some situations. In no case should the drainage be filled so that water will be impounded.

Part 3. Production Operations

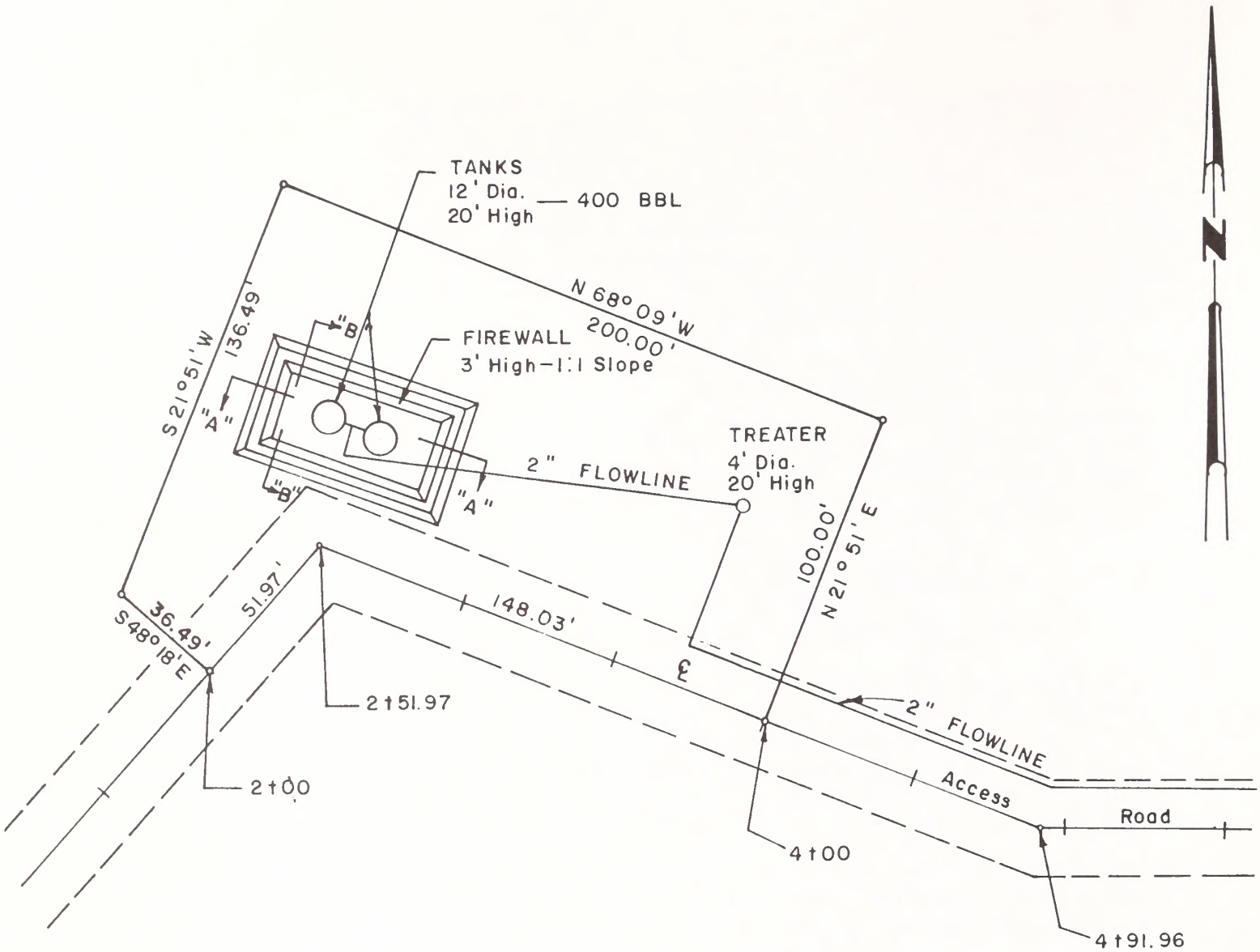
A. General Description of Production Operations

Production activities include installation of production equipment and product treatment facilities, flowlines and pipelines and disposal of produced water. Normally oil production requires more tanks and treatment facilities when compared to gas production. In addition, oil production facilities require more maintenance and have a greater potentail for spills. In many cases gas production is dry and does not require the use of tanks.

The oil and/or gas, and in some cases produced water, is transported to the production facilities through flowlines typically 2 to 4 inches in diameter. Flowlines may or may not be buried.

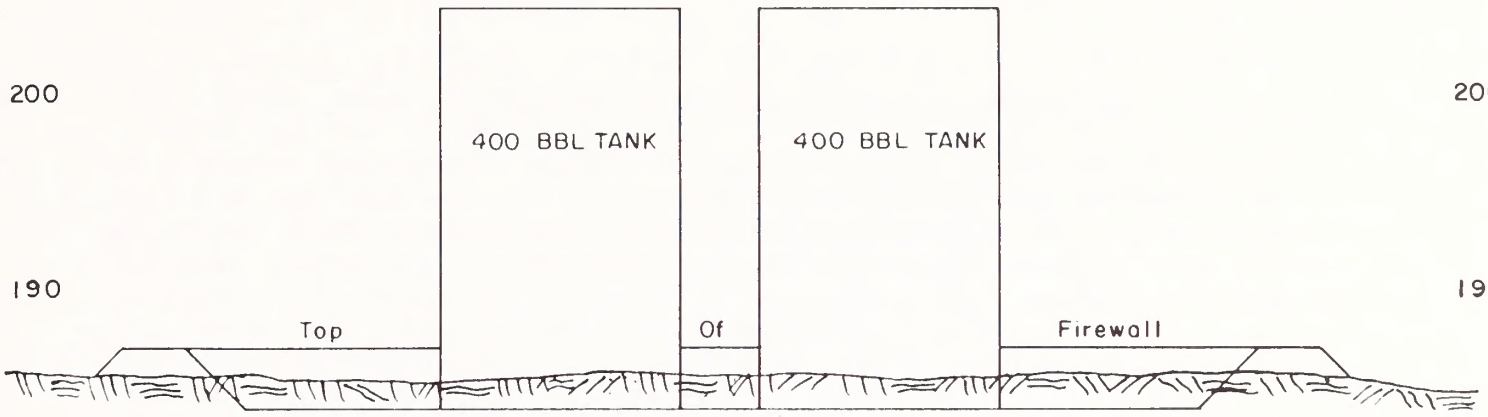
Production equipment which may be installed includes pumping units, tanks, dehydrators, separators, and meters. Tank batteries are used to store produced oil or condensate prior to sale, or produced water, prior to disposal. The tank battery and other treatment equipment is normally located on the well pad or adjacent to the access road. In developed fields a centrally located facility may be used. A typical tank battery consists of two 400 barrel tanks for produced oil and one 400 barrel tank for produced water. These tanks are normally enclosed by a firewall designed to contain the fluids in the event of a spill. The typical dimensions of the tank battery facility is 70 feet by 35 feet. This facility is typically located 150 feet from the well and other treatment facilities. Figures No. 7 and 8 are diagrams of a typical tank battery facilities for oil production.

Dehydrators and separators are used to separate the various petroleum products and remove water. This facility is typically located 150 feet from the well and tank battery. Meters are used to measure the amount of gas produced before it is put into a transmission pipeline.

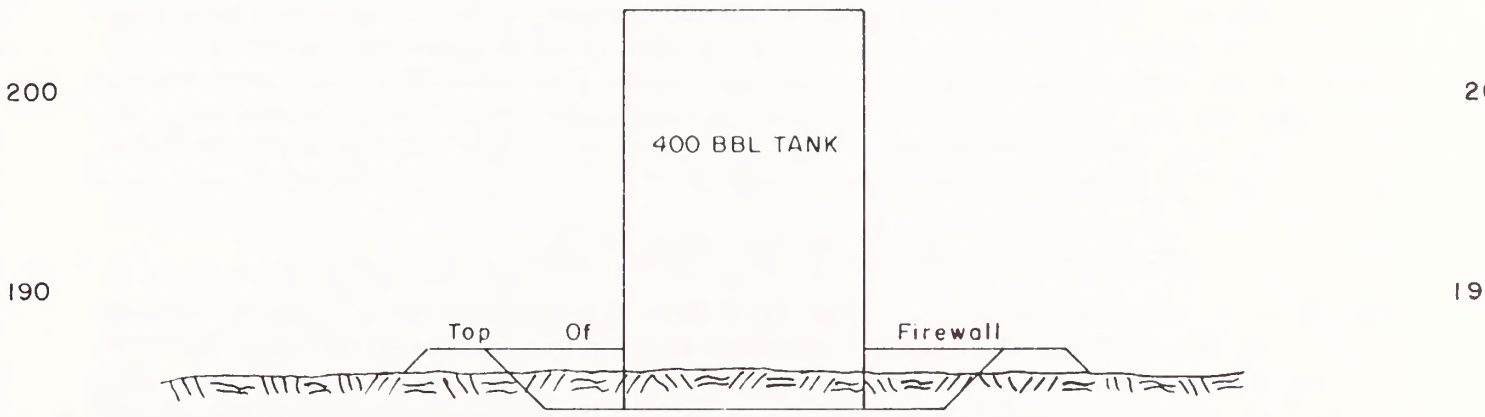


1" = 50'

Figure No. 7



CROSS SECTION "A" — "A"



CROSS SECTION "B" — "B"

1" = 10'

Figure No. 8

Produced water is often high in chloride content. The water must be properly disposed of according to federal and state standards. In most cases the water is removed from the site and disposed of by injection into an injection well. Once treated the oil is sold and removed either by truck or pipeline. Gas is normally transmitted by pipeline.

Pipelines transport oil or gas from the wells or production facility to a trunk line and then to the main transmission line from the area. Trunk lines are generally 6 to 8 inches in diameter and are buried, as are transmission lines which vary in diameter from 10 to 36 inches. The area required to construct a flowline or pipeline varies from about 15 feet wide for a 2 to 4 inch surface line to 75 feet or more for transmission lines 24 to 36 inches in diameter. Surface disturbance is primarily dependent on size of the line and topography.

The first step in pipeline construction is to clear the right-of-way of any obstacles in the line route such as vegetation, rocks and abrupt surface irregularities. Next, topsoil over the trench location is removed and stockpiled on the side of the trench away from the working side of the trench. Then trenchers or backhoes dig the trench in which the pipe will be laid. The ditch must be deep enough to allow 3 to 5 feet of cover over the pipeline. Fill excavated from the trench can be placed on either side of the trench taking care not to mix it with any topsoil that may be stockpiled.

After the trench is ready, the pipe is laid along side the open trench in separate lengths. The lengths of pipe are either positioned by hand or side boom tractors for welding together.

The welds are inspected, pipe is cleaned, coated with tar, covered with fiberglass, and finally wrapped with tar paper, kraft paper or asbestos felt. The pipe is then lowered into the ditch which is backfilled and compacted. The right-of-way is regraded to the original contour and the topsoil is replaced. Compressor stations may be necessary to increase production pressure to the same level as pipeline pressure.

B. Procedural Practices for Production Operations

The method used to approve operations and the installation of facilities subsequent to drilling depends on whether or not the facility is part of the leasehold operation. All facilities used for production, treatment and transmission of oil and gas are considered leasehold facilities to the point where the product is sold. This includes facilities that are off lease and authorized under an off lease storage permit. Such facilities include storage tanks and processing facilities, sales facilities, all pipelines upstream from such facilities, and other facilities to aid production such as water disposal lines, and gas or water injection lines.

When such facilities require new construction, reconstruction, or alteration of existing facilities and surface disturbance will result the proposal for installation of such facilities is subject to the same type of environmental review process used prior to drilling. The procedures for subsequent operations are stated in Onshore Oil and Gas Order No. 1.

Pipelines and other facilities beyond that point must be approved by right of way permits, special use permits or permission of the land owner depending on the land ownership. BLM has approval authority over this category of facilities only on public domain surface. Such approvals are granted according to CFR 43 Part 2880.

C. Design and Operation Standards for Production Operations

All areas not needed for production purposes must be reclaimed in accordance with BLM and the SMA specifications. The locations selected for tank batteries, pits, and pumping stations, etc., should be planned so as to minimize long-term disruption of the surface resources. Construction techniques and other practices should be employed that would minimize surface disturbance and effects on other resources, and maintain the reclamation potential of the site.

BLM regulations require that various equipment be used for safety purposes. This includes belt guards and guard rails on the pumping unit. Some of the design and operating standards for production operations required by the Jackson District are as follows:

All tanks must be enclose with a firewall capable of containing 1 1/2 times the contents of the largest tank in the battery. Any crossing into the firewall must use a structure such as a small platform to prevent the wall from eroding.

In some cases devices such as automatic shut down switches on production equipment or sump pumps within the tank battery firewall may be required. The necessity for such equipment depends on several factors including the location of the facility, the frequency that the facility is inspected by the operator and the record of lease compliance and spills. The District maintains a record of compliance for each lease as will as a record of spills. This provides information needed to determine the necessity of additional pollution control devices.

Devices used to drain the area within the firewall such as pipes, drains, siphon hoses pumps or cutting of the wall is prohibited. Any fluids contained within the firewall must be disposed in a manner specified by BLM.

Flowlines should be placed adjacent to the access road as much as possible. This reduces the impact to other areas, reduces the chance that such lines will be accidentally cut by other activities and provides a better means to monitor the lines for leaks. Polyurethane flowlines must be buried due to the possibility of these lines burning in a fire.

Clamps may be used on steel flowlines to repair leaks but may be used only as a temporary measure not to exceed 30 days.

Evaporation pits for disposal of produced water are not permitted.

Part 4. Well Abandonment and Reclamation

A. General Description of Abandonment and Reclamation

Well plugging and abandonment requirements vary with the rock formations, subsurface water, well depth and tother factors. Generally, however, the area below the surface casing is filled with heavy drilling mud and cement plugs are installed at various points to protect aquifers and known oil and gas producing formations. A cement plug is installed at the top of the surface casing. A pipe monument giving the location and name of the well is required unless waived. If waived, the casing may be cut off below ground level.

Dry holes are plugged immediately following testing of the well. In most cases, wells that produce are plugged as soon as they are depleted. In some cases, depleted wells are not plugged immediately but are allowed to stand idle for possible later use in a secondary recovery program or other uses such as conversion to a disposal well. Surface flowlines and production equipment are removed, but buried pipelines are often left in place.

One of the initial steps to restoration is disposal of the mud. The drilling mud is normally disposed of by one or more of several methods. Depending on the method used this may occur before or after plugging of the well. One method used prior to plugging consists of pumping the mud down the well. In the case of a dry hole the mud is pumped directly through the surface casing. For a producing well the mud is pumped behind the production casing. Another method consists of evaporation and burial of the mud on site. This may require spreading or trenching of the mud to promote rapid drying. Another method consists of off site disposal in a commercial pit or surface discharge.

After plugging, the well pad, reserve pit and access road, are restored. This may include the use of dozers, graders, and backhoes to recontour the disturbed areas.

B. Procedural Practices for Abandonment and Reclamation

Well abandonment operations may not be started without prior approval of the BLM. The operator is required to submit a "Sundry Notices and Reports on Wells," Form 3160-5. The Sundry Notices serves as the operator's Notice of Intention of Abandon. In the case of newly drilled dry holes, failures, and in emergency situations, oral approval may be obtained from the authorized officer subject to written confirmation by application. Abandonment will not be considered complete until surface rehabilitation work as required by the drilling permit and/or abandonment approval is complete. If revegetation requirements are contained in either of these permits this requirement is not considered complete until vegetation is established to the satisfaction of the SMA. The bond is retained by BLM until all requirements in the permits are met.

C. Design and Operation Standards for Abandonment and Reclamation

Reclamation is normally initiated at two stages. Should a well be placed in production the areas not needed for production must be reclaimed. If the well is dry or when the well is depleted than abandonment and final reclamation is required.

A reclamation plan is part of the surface use plan of operations. When abandoning a well and other facilities that do not have a previously approved plans reclamation measures are required based on the conditions existing at the time of abandonment.

All pits must be reclaimed to a natural condition similar to the rest of the reclaimed pad area. In addition, the reclaimed pit must be restored to a safe and stable condition. Pits are not to be filled while still containing fluids. The contents must be dry, or removed prior to filling. The pit area should be mounded to allow for settling. The mounding will also allow for positive surface drainage off the reclaimed pit. All other excavation or drill holes must be closed by backfilling once dry and graded to conform to the surrounding terrain.

Site preparation prior to seeding may include ripping, scarifying, contour furrowing, terracing, reduction of steep cut and fill slopes, waterbarring, etc., (see Figure No. 9). The disturbed sites should be prepared to provide a seedbed for re-establishment of desirable vegetation and reshaped to blend with the natural contour.

Disturbed areas must be revegetated after the site has been satisfactorily prepared. The operator will be advised as to species, methods of revegetation and seasons to plant.

Seeding should be done by drilling on the contour whenever practical. Seeding and/or planting should be repeated until satisfactory revegetation is accomplished, as determined by BLM or the SMA. Mulching, fertilizing, tree planting, fencing, or other practices may be required.

For all activities, which alter landforms, disturb vegetation or require temporary or permanent structures, the operator may be required to comply with visual resource management objectives for the area.

Reclamation and abandonment of pipelines and flowlines may involve replacing fill in the original cuts, reducing and grading cut and fill slopes to conform to the adjacent terrain, replacement of surface soil material, waterbarring and revegetating in accordance with normal rehabilitation practices.

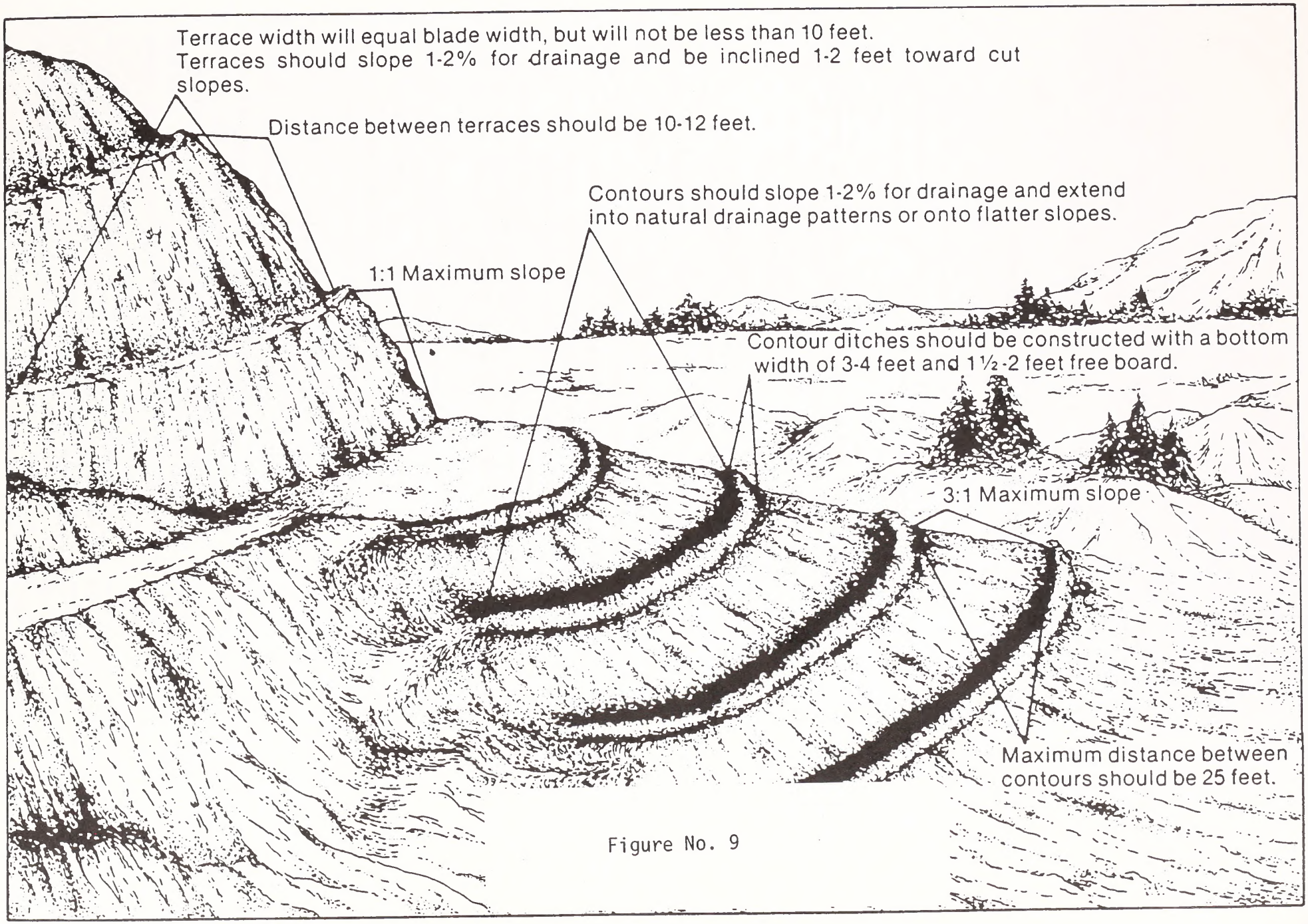

Terrace width will equal blade width, but will not be less than 10 feet.
Terraces should slope 1-2% for drainage and be inclined 1-2 feet toward cut slopes.
Distance between terraces should be 10-12 feet.
Contours should slope 1-2% for drainage and extend into natural drainage patterns or onto flatter slopes.
1:1 Maximum slope
Contour ditches should be constructed with a bottom width of 3-4 feet and 1½-2 feet free board.
3:1 Maximum slope
Maximum distance between contours should be 25 feet.

Figure No. 9

Exhibit No. 1

Form 3100-11*
(March 1984)

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

FORM APPROVED
OMB No. 1004-0008
Expires January 31, 1986

Serial No.

OFFER TO LEASE AND LEASE FOR OIL AND GAS

The undersigned (reverse) offers to lease all or any of the lands in item 2 that are available for lease pursuant to the Mineral Leasing Act of 1920 (30 U.S.C. 181 et seq.), the Mineral Leasing Act for Acquired Lands (30 U.S.C. 351-359), the Attorney General's Opinion of April 2, 1941 (40 OP. Atty. Gen. 41), or the

Read Instructions Before Completing

1. Name

   Street

   City, State, Zip Code

2. This offer/lease is for: (Check Only One) ☐ PUBLIC DOMAIN LANDS ☐ ACQUIRED LANDS (percent U.S. interest _____)

   Surface managing agency if other than BLM: _____ Unit/Project _____

   Legal description of land requested:

   T. R. Meridian State County

   Total acres applied for _____

   Amount remitted: Filing fee $ _____ Rental fee $ _____ Total $ _____

DO NOT WRITE BELOW THIS LINE

3. Land included in lease:

   T. R. Meridian State County

   Total acres in lease _____

   Rental retained $ _____

In accordance with the above offer, or the previously submitted simultaneous oil and gas lease application or competitive bid, this lease is issued granting the exclusive right to drill for, mine, extract, remove and dispose of all the oil and gas (except helium) in the lands described in item 3 together with the right to build and maintain necessary improvements thereupon for the term indicated below, subject to renewal or extension in accordance with the appropriate leasing authority. Rights granted are subject to applicable laws, the terms, conditions, and attached stipulations of this lease, the Secretary of the Interior's regulations and formal orders in effect as of lease issuance, and to regulations and formal orders hereafter promulgated when not inconsistent with lease rights granted or specific provisions of this lease.

Type and primary term of lease:

☐ Simultaneous noncompetitive lease (ten years)

☐ Regular noncompetitive lease (ten years)

☐ Competitive lease (five years)

☐ Other _____

THE UNITED STATES OF AMERICA

by _____
(Signing Officer)

_____ (Title) _____ (Date)

EFFECTIVE DATE OF LEASE _____

*(Formerly 3110-1, 2, 3, 3120-1, 7, 3130-4, 5, and 7)

4. (a) Undersigned certifies that (1) offeror is a citizen of the United States; an association of such citizens; a municipality; or a corporation organized under the laws of the United States or of any State or Territory thereof; (2) all parties holding an interest in the offer are in compliance with 43 CFR 3100 and the leasing authorities; (3) offeror's chargeable interests, direct and indirect, in either public domain or acquired lands do not exceed 200,000 acres in oil and gas options or 246,080 acres in options and leases in the same State, or 300,000 acres in leases and 200,000 acres in options in either leasing District in Alaska; and (4) offeror is not considered a minor under the laws of the State in which the lands covered by this offer are located.

(b) Undersigned agrees that signature to this offer constitutes acceptance of this lease, including all terms, conditions, and stipulations of which offeror has been given notice, and any amendment or separate lease that may include any land described in this offer open to leasing at the time this offer was filed but omitted for any reason from this lease. The offeror further agrees that this offer cannot be withdrawn, either in whole or part, unless the withdrawal is received by the BLM State Office before this lease, an amendment to this lease, or a separate lease, whichever covers the land described in the withdrawal, has been signed on behalf of the United States.

This offer will be rejected and will afford offeror no priority if it is not properly completed and executed in accordance with the regulations, or if it is not accompanied by the required payments. 18 U.S.C. Sec. 1001 makes it a crime for any person knowingly and willfully to make to any Department or agency of the United States any false, fictitious or fraudulent statements or representations as to any matter within its jurisdiction.

Duly executed this _____ day of _____, 19 _____.

_____
(Signature of Lessee or Attorney-in-fact)

LEASE TERMS

Sec. 1. Rentals—Rentals shall be paid to proper office of lessor in advance of each lease year. Annual rental rates per acre or fraction thereof are:

(a) Simultaneous noncompetitive lease, $1.00 for the first 5 years, thereafter, $3.00;
(b) Regular noncompetitive lease, $1.00;
(c) Competitive lease, $2.00; or
(d) Other, see attachment.

If all or part of a noncompetitive leasehold is determined to be within a known geological structure or a favorable petroleum geological province, annual rental shall become $2.00, beginning with the lease year following notice of such determination. However, a lease that would otherwise be subject to rental of more than $2.00 shall continue to be subject to the higher rental.

If this lease or a portion thereof is committed to an approved cooperative or unit plan which includes a well capable of producing leased resources, and the plan contains a provision for allocation of production, royalties shall be paid on the production allocated to this lease. However, annual rentals shall continue to be due at the rate specified in (a), (b), (c), or (d) for those lands not within a participating area.

Failure to pay annual rental, if due, on or before the anniversary date of this lease (or next official working day if office is closed) shall automatically terminate this lease by operation of law. Rentals may be waived, reduced, or suspended by the Secretary upon a sufficient showing by lessee.

Sec. 2. Royalties—Royalties shall be paid to proper office of lessor. Royalties shall be computed in accordance with regulations on production removed or sold. Royalty rates are:

(a) Simultaneous noncompetitive lease, 12½%;
(b) Regular noncompetitive lease, 12½%;
(c) Competitive lease, see attachment; or
(d) Other, see attachment.

Lessor reserves the right to specify whether royalty is to be paid in value or in kind, and the right to establish reasonable minimum values on products after giving lessee notice and an opportunity to be heard. When paid in value, royalties shall be due and payable on the last day of the month following the month in which production occurred. When paid in kind, production shall be delivered, unless otherwise agreed to by lessor, in merchantable condition on the premises where produced without cost to lessor. Lessee shall not be required to hold such production in storage beyond the last day of the month following the month in which production occurred, nor shall lessee be held liable for loss or destruction of royalty oil or other products in storage from causes beyond the reasonable control of lessee.

Minimum royalty shall be due for any lease year after discovery in which royalty payments aggregate less than $1.00 per acre. Lessee shall pay such difference at end of lease year. This minimum royalty may be waived, suspended, or reduced, and the above royalty rates may be reduced, for all or portions of this lease if the Secretary determines that such action is necessary to encourage the greatest ultimate recovery of the leased resources, or is otherwise justified.

An interest charge shall be assessed on late royalty payments or underpayments in accordance with the Federal Oil and Gas Royalty Management Act of 1982 (FOGRMA) (96 Stat. 2447). Lessee shall be liable for royalty payments on oil and gas lost or wasted from a lease site when such loss or waste is due to negligence on the part of the operator, or due to the failure to comply with any rule, regulation, order, or citation issued under FOGRMA or the leasing authority.

Sec. 3. Bonds—Lessee shall file and maintain any bond required under regulations.

Sec. 4. Diligence, rate of development, unitization, and drainage—Lessee shall exercise reasonable diligence in developing and producing, and shall prevent unnecessary damage to, loss of, or waste of leased resources. Lessor reserves right to specify rates of development and production in the public interest and to require lessee to subscribe to a cooperative or unit plan, within 30 days of notice, if deemed necessary for proper development and operation of area, field, or pool embracing these leased lands. Lessee shall drill and produce wells necessary to protect leased lands from drainage or pay compensatory royalty for drainage in amount determined by lessor.

Sec. 5. Documents, evidence, and inspection—Lessee shall file with proper office of lessor, not later than 30 days after effective date thereof, any contract or evidence of other arrangement for sale or disposal of production. At such times and in such form as lessor may prescribe, lessee shall furnish detailed statements showing amounts and quality of all products removed and sold, proceeds therefrom, and amount used for production purposes or unavoidably lost. Lessee may be required to provide plats and schematic diagrams showing development work and improvements, and reports with respect to parties in interest, expenditures, and depreciation costs. In the form prescribed by lessor, lessee shall keep a daily drilling record, a log, information on well surveys and tests, and a record of subsurface investigations and furnish copies to lessor when required. Lessee shall keep open at all reasonable times for inspection by any authorized officer of lessor, the leased premises and all wells, improvements, machinery, and fixtures thereon, and all books, accounts, maps, and records relative to operations, surveys, or investigations on or in the leased lands. Lessee shall maintain copies of all contracts, sales agreements, accounting records, and documentation such as billings, invoices, or similar documentation that supports costs claimed as manufacturing, preparation, and/or transportation costs. All such records shall be maintained in lessee's accounting offices for future audit by lessor. Lessee shall maintain required records for 6 years after they are generated or, if an audit or investigation is underway, until released of the obligation to maintain such records by lessor.

During existence of this lease, information obtained under this section shall be closed to inspection by the public in accordance with the Freedom of Information Act (5 U.S.C. 552).

Sec. 6. Conduct of operations—Lessee shall conduct operations in a manner that minimizes adverse impacts to the land, air, and water, to cultural, biological, visual, and other resources, and to other land uses or users. Lessee shall take reasonable measures deemed necessary by lessor to accomplish the intent of this section. To the extent consistent with lease rights granted, such measures may include, but are not limited to, modification to siting or design of facilities, timing of operations, and specification of interim and final reclamation measures. Lessor reserves the right to continue existing uses and to authorize future uses upon or in the leased lands, including the approval of easements or rights-of-ways. Such uses shall be conditioned so as to prevent unnecessary or unreasonable interference with rights of lessee.

Prior to disturbing the surface of the leased lands, lessee shall contact lessor to be apprised of procedures to be followed and modifications or reclamation measures that may be necessary. Areas to be disturbed may require inventories or special studies to determine the extent of impacts to other resources. Lessee may be required to complete minor inventories or short term special studies under guidelines provided by lessor. If in the conduct of operations, threatened or endangered species, objects of historic or scientific interest, or substantial unanticipated environmental effects are observed, lessee shall immediately contact lessor. Lessee shall cease any operations that would result in the destruction of such species or objects.

Sec. 7. Mining operations—To the extent that impacts from mining operations would be substantially different or greater than those associated with normal drilling operations, lessor reserves the right to deny approval of such operations.

Sec. 8. Extraction of helium—Lessor reserves the option of extracting or having extracted helium from gas production in a manner specified and by means provided by lessor at no expense or loss to lessee or owner of the gas. Lessee shall include in any contract or sale of gas the provisions of this section.

Sec. 9. Damages to property—Lessee shall pay lessor for damage to lessor's improvements, and shall save and hold lessor harmless from all claims for damage or harm to persons or property as a result of lease operations.

Sec. 10. Protection of diverse interests and equal opportunity—Lessee shall: pay when due all taxes legally assessed and levied under laws of the State or the United States; accord all employees complete freedom of purchase; pay all wages at least twice each month in lawful money of the United States; maintain a safe working environment in accordance with standard industry practices; and take measures necessary to protect the health and safety of the public.

Lessor reserves the right to ensure that production is sold at reasonable prices and to prevent monopoly. If lessee operates a pipeline, or owns controlling interest in a pipeline or a company operating a pipeline, which may be operated accessible to oil derived from these leased lands, lessee shall comply with section 28 of the Mineral Leasing Act of 1920.

Lessee shall comply with Executive Order No. 11246 of September 24, 1965, as amended, and regulations and relevant orders of the Secretary of Labor issued pursuant thereto. Neither lessee nor lessee's subcontractors shall maintain segregated facilities.

Sec. 11. Transfer of lease interests and relinquishment of lease—As required by regulations, lessee shall file with lessor any assignment or other transfer of an interest in this lease. Lessee may relinquish this lease or any legal subdivision by filing in the proper office a written relinquishment, which shall be effective as of the date of filing, subject to the continued obligation of the lessee and surety to pay all accrued rentals and royalties.

Sec. 12. Delivery of premises—At such time as all or portions of this lease are returned to lessor, lessee shall place affected wells in condition for suspension or abandonment, reclaim the land as specified by lessor and, within a reasonable period of time, remove equipment and improvements not deemed necessary by lessor for preservation of producible wells.

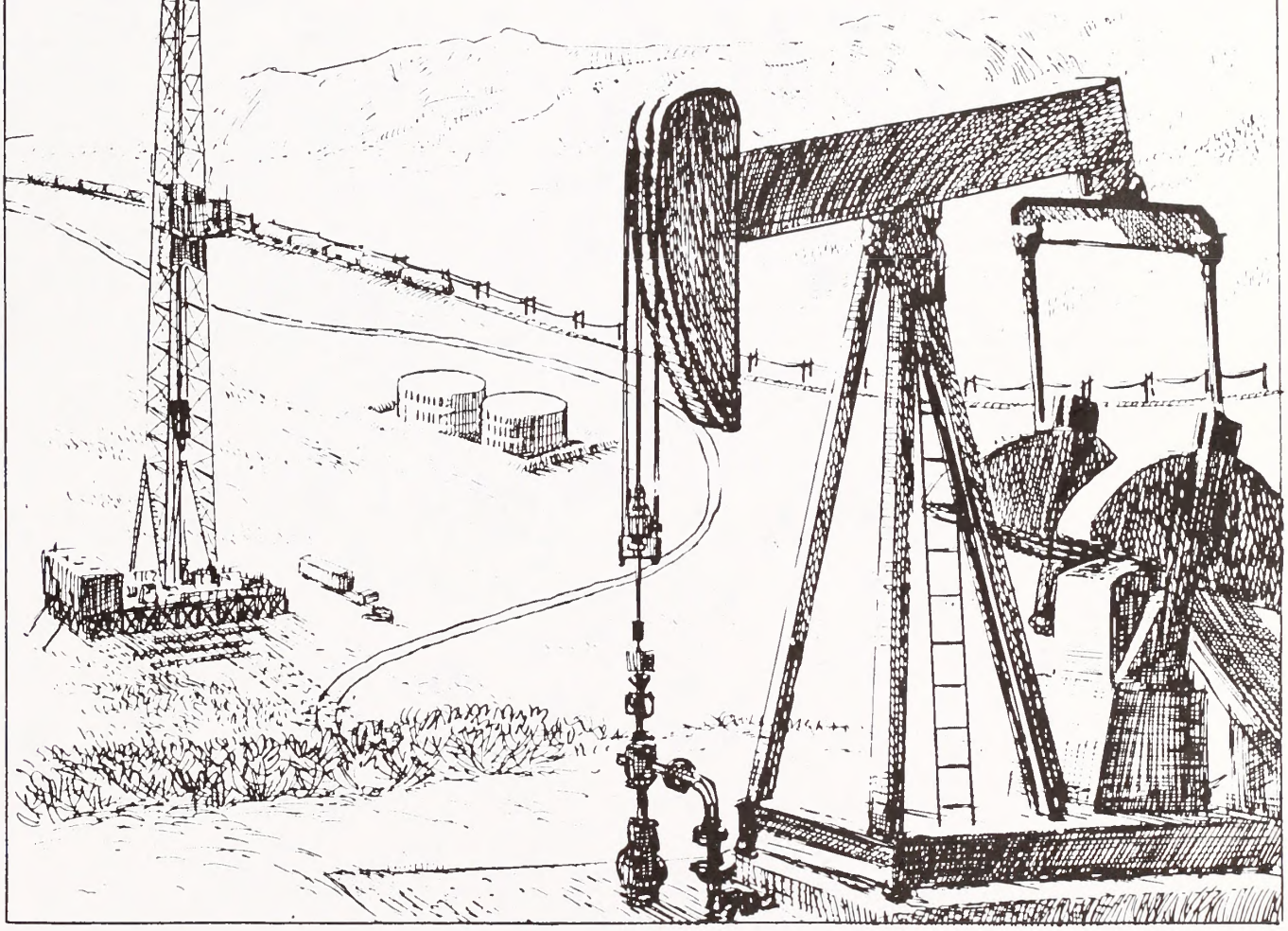
Sec. 13. Proceedings in case of default—If lessee fails to comply with any provisions of this lease, and the noncompliance continues for 30 days after written notice thereof, this lease shall be subject to cancellation. Lessee shall also be subject to applicable provisions and penalties of FOGRMA (96 Stat. 2447). However, if this lease includes land known to contain valuable deposits of leased resources, it may be cancelled only by judicial proceedings. This provision shall not be construed to prevent the exercise by lessor of any other legal and equitable remedy, including waiver of the default. Any such remedy or waiver shall not prevent later cancellation for the same default occurring at any other time.

Sec. 14. Heirs and successors-in-interest—Each obligation of this lease shall extend to and be binding upon, and every benefit hereof shall inure to the heirs, executors, administrators, successors, beneficiaries, or assignees of the respective parties hereto.

Exhibit No. 2

Onshore Oil and Gas Order

No. 1
Approval of Operations
on Onshore Federal and
Indian Oil and Gas Leases.



Issued Under
43 CFR 3164

U.S. DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

Jackson District Office
300 Woodrow Wilson, Suite 326
Jackson, MS 39213
(601)965-4405

Federal Register

Friday
October 21, 1983

Part III

Department of the Interior

Bureau of Land Management

Onshore Oil and Gas Order No. 1; Approval of Operations on Onshore Federal and Indian Oil and Gas Lease; Final Rule

List of Subjects in 43 CFR Part 3160

Government contracts, Oil and gas exploration, Public lands, Mineral resources, Reporting requirements.

Under the authority of the Act of February 25, 1920, as amended and supplemented (30 U.S.C. 189, 226), and Executive Order 12291 (46 FR 13193), Part 3160, Group 3100, Subchapter C, Chapter II of Title 43 of the Code of Federal Regulations is amended as set forth below.

Dated: September 21, 1983.

Harold W. Furman II,

Acting Assistant Secretary of the Interior.

PART 3160—ONSHORE OIL AND GAS OPERATIONS

Section 3164.1(b) is amended by adding the following table:

§ 3164.1 Onshore Oil and Gas Orders.

* * * * *

(b) * * *

Order No.	Subject	Effective date	Federal Register reference	Supersedes
1	Approval of Operations	Nov. 21, 1983	48 FR —	NTL-6.

Appendix—Text of Oil and Gas Order

Note.—This appendix will not appear in the Code of Federal Regulations.

Contents

Onshore Oil and Gas Order

Federal and Indian Oil and Gas Leases

Order No. 1

Effective: November 21, 1983.

Approval of Operations

Introduction

This Order is established pursuant to the authority prescribed in 43 CFR Part 3160, formerly 30 CFR 221. Approval of all proposed exploratory, development, and service wells, and all required approvals of subsequent well operations and other lease operations, shall be obtained in accordance with 43 CFR 3162.3–1, 3162.3–2, 3162.3–3, 3162.3–4 and 3162.5–1, formerly 30 CFR 221.23, 221.27, 221.28, 221.29, or 221.30, as appropriate.

All wells approved for drilling under the provisions of this Order shall have been included in a drilling plan, as required under 43 CFR 3162.3–1(d), formerly 30 CFR 221.23(d).

A drilling plan may be submitted for a single well, or for several wells that are proposed to be drilled to the same zone within a field or area of geological and environmental similarity. Plans for additional development of the leasehold should be considered in the submittal.

However, approval of Form 3160–3, formerly 9–331C (Application for Permit to Drill, Deepen, or Plug Back) is required for each well, and in order to be complete an Application for Permit to Drill (APD) shall include all information required under 43 CFR 3162.3–1 (d) and (e). A technically and administratively complete APD includes, in addition to Form 3160–3, a drilling plan, evidence of bond coverage, a designation of operator, when appropriate, and such other information as may be required by applicable Order or Notice to evaluate the proposal. Refer to section III.G. for more detailed guidance on complete APD's.

Certain subsequent well operations and other lease operations involving additional surface disturbance shall be included in a plan submitted on Form 3160–5, formerly 9–331 (Sundry Notices and Reports On Wells), and approved under the provisions of this Order pursuant to 43 CFR 3162.3–2 or 3162.3–3, formerly 30 CFR 221.27 or 221.28, respectively.

A report on all subsequent well operations shall be filed on Form 3160–5, as prescribed in 43 CFR 3162.3–2. A notice of intention to abandon a well and a subsequent report of abandonment shall also be filed on Form 3160–5, as required by 43 CFR 3162.3–4.

All applications for approval under the provisions of this Order shall be submitted to the appropriate authorized officer of the Bureau of Land Management (BLM). "Authorized Officer" means any person authorized to perform the duties prescribed. To be advised of the proper BLM official and office with which to file an application, the lessee/operator may contact the appropriate District Manager of BLM having jurisdiction over lease operations in a particular area.

The lessee/operator shall comply with the following requirements:

I. *Accountability.* Lessees and operators have the responsibility to see that their exploration, development, production, and construction operations are conducted in a manner which (1) conforms with applicable Federal laws and regulations and with State and local laws and regulations to the extent that such State and local laws are applicable to operations on Federal or Indian leases; (2) conforms with the lease terms, lease stipulations, and conditions of approval; (3) results in diligent development and efficient resource recovery; (4) protects the lease from drainage; (5) affords adequate safeguards for the environment; (6) results in the proper reclamation of disturbed lands; (7) conforms with current available technology and practice; (8) assures that underground sources of fresh water will not be endangered by any fluid injection operation; and (9) otherwise assures the protection of the public health and safety. Lessees and operators shall be held fully accountable for their contractors' and subcontractors' compliance with the requirements of the approved permit and/or plan. Drilling/construction and associated operations shall not be conducted without prior approval of the authorized officer of BLM. BLM approval of the APD does not relieve the lessee and operator from obtaining and other authorizations required for operations on Federal and Indian lands.

II. *Special Situations.* Lessees and operators, as well as their contractors and subcontractors, shall not commence any operation or construction activity on a lease, other than cultural resource inventories and surveying and staking well locations on Federal and Indian lands, without the prior approval of the authorized officer of BLM, except for certain subsequent operations (see Section IV. of this Order). The terms and conditions of an approved permit and drilling plan, or other plan, shall not be

altered unless BLM first has approved an amended or supplemental permit and/or plan covering any such modifications.

For proposed operations on a committed State of fee tract in a Federally supervised unit or communitized tract, the operator shall furnish a copy of the approved State permit to the authorized officer of BLM which will be accepted for record purposes. In addition, in cases where an access road to a non-Federal or non-Indian drillsite will cross leased Federal or Indian lands, the operator shall submit a surface use plan only for those portions of the access road on Federal or Indian lands where new construction or reconstruction will occur. Such plans shall be submitted to the authorized officer of BLM or appropriate Federal Surface Management Agency (SMA) and approval obtained prior to commencement of construction operations on the Federal or Indian surface. For privately owned surface, refer to section VII.

III. *Drilling Operations.*

A. *Surveying and Staking.* Surveying and staking may be done without advance approval from the authorized officer of BLM or other appropriate SMA and prior to the conduct of any required cultural resource inventory, except for lands administered by the Department of Defense or other lands used for military purposes, or where significant surface disturbance is likely to occur.

Lessees and operators are strongly encouraged to notify the appropriate SMA prior to entry upon the lands for the purposes of surveying and staking. Early notification will allow the SMA to apprise the lessees and operators of any existing conditions, knowledge of which could result in saving of time and money by both Industry and Government. These include but are not limited to:

—Whether a cultural resource inventory is required;
—Presence of threatened or endangered species and/or critical habitats;
—Vehicle access restrictions; and/or
—Permitting requirements applicable to affected lands outside the leasehold boundary.

Where the surface is privately owned or held in trust of Indian benefit, the lessee/operator is responsible for making access arrangements with the private surface owner or the Bureau of Indian Affairs (BIA) and Indian tribe or Indian allottee(s) prior to entry upon the lands for the purpose of surveying and staking.

Staking shall include the well location, two 200-foot directional reference stakes, the exterior dimensions of the drill pad, reserve pit and other areas of surface disturbance, cuts and fills, and centerline flagging of new roads with road stakes being visible from one to the next. Cut and fill staking applies only to the wellsite, reserve pit, and, if off-location, and ancillary facilities.

B. *Material to be Filed.*

1. *Notice of Staking.* Prior to filing a complete APD, the lessee or operator may, at its option, file a Notice of Staking (Attachment A) with the authorized officer of BLM and appropriate office of any other involved SMA. In Alaska, a copy of the Notice shall also be sent to the appropriate Borough when a subsistence stipulation is part of the lease.

The information contained in the Notice of Staking (NOS) will aid in identifying the need for associated rights-of-way and special use permits. If all required information is not included, the NOS shall be returned to the operator for modification.

2. *Application for Permit to Drill (APD).* Regardless of whether an NOS is filed, the lessee or operator shall file an APD. This application shall be administratively and technically complete prior to approval. The authorized officer of BLM shall advise the lessee or operator, within 7 working days of receipt of the application, as to whether or not the application is complete. If the application is complete, oral notification will suffice. If the application is not complete, notification to that effect shall be made in writing even though the lessee or operator may have already received oral notification. For purposes of written notification, Attachment B, Checklist For Applicant Notification, shall be mailed to the applicant within the 7-day period. The notification shall advise the lessee or operator of any defects that need correcting and of any additional information required. If the deficiencies are not corrected and/or the additional required information is not submitted within 45 days of the date of any oral or written notice (if no prior oral notice), the application shall be returned to the proponent.

Upon initiation of the APD process, the authorized officer of BLM shall consult with any other involved SMA and with other appropriate interested parties, and shall take one of the following actions within 30 days: (1) Approve the application as submitted or with appropriate modifications or stipulations; (2) return the application and advise the lessee or operator of the reasons for disapproval; or (3) advise the lessee or operator, either in writing or orally with subsequent written confirmation, of the reasons why final action will be delayed and the date such final action is expected.

When the NOS option is followed, BLM shall strive to process the subsequent related APD within 10 days of the APD's receipt. However, in either situation, the process of reviewing the APD and advising the lessee or operator as to whether it is technically and administratively complete shall be considered a part of the overall APD processing time, i.e., 30 days in case of the APD option and 10 days if the NOS process is utilized. Operators are cautioned that with respect to any particular well, the option selected initially, of either filing both an NOS and a subsequent APD or only an APD, is to be followed and there shall be no shifting between the two options. If operators fail to maintain a consistent approach in this regard, the processing time already expended shall not be counted as part of the above 30-day period.

The processing of applications shall be given a high priority, and individual applications shall be processed according to the date the application is received by the appropriate BLM office. If it is not possible for BLM actions to be taken prior to lease expiration, the lessee or operator shall be advised, at least orally, prior to the lease expiration date, with all such notifications confirmed in writing. Said advice shall detail the reasons for delay so that the lessee or operator may take such appeal or other recourse to preserve the lease as is allowed by law and/or regulation. The appropriate BLM office telephone number and address shall be furnished to the lessee or operator with the earliest notification or advice.

C. *Conferences and Inspections.* An onsite predrill inspection shall be scheduled and conducted by the appropriate BLM office within 15 days of receiving the applicant's initially-filed document, i.e., either an NOS or a complete APD. In special circumstances, the authorized officer of BLM may require the filing of a complete APD prior to the scheduling of an onsite predrill inspection. Representatives of the appropriate BLM office, the operator and other interested parties, such as any other involved SMA, the appropriate Alaska Borough (when a subsistence stipulation is part of the lease), and the operator's principal dirt and drilling contractors shall attend the predrill inspection. When appropriate, the operator's surveyor and archeologist should also participate in the inspection. If any other involved SMA is not able to participate at the desired time, the

inspection may be rescheduled provided it can be conducted within the 15-day period. When private surface is involved, the lessee or operator shall furnish the name, address and telephone number of the private surface owner on the NOS form or, in the surface use program, such information shall be attached to the APD. The BLM shall invite the surface owner to participate in the onsite inspection. This invitation will be extended as early as possible. However, a surface owner's inability to attend shall not delay the scheduled inspection unless BLM can conveniently reschedule the inspection within the 15-day time period. Joint inspections, i.e., those involving any other SMA, normally shall not be held for proposed in-fill well locations in developed fields if an appropriate environmental assessment (EA) already has been completed by BLM for the field or that area of the field. However, if staffing permits, a representative of BLM shall inspect those proposed locations where a joint predrill inspection is not held. At the time of onsite inspection, staking of the location shall have occurred, as specified in part A of this section. The surface use and reclamation stipulations shall be developed during the onsite inspection and provided to the operator either at the location or within 5 working days from the date of the onsite inspection, barring unusual circumstances. These requirements shall be incorporated into the complete application, when filed, if the proponent is following the NOS option. Otherwise, these requirements shall be incorporated as conditions of the APD approval if an NOS is not filed. However, this does not preclude the possibility of additional conditions being imposed as a result of the review of the complete application.

D. *Processing Time Frames.* The following table summarizes the major time frames involved in processing most APD's:

APD OPTION

Action items	Days
Onsite inspection	Within 15 days after receipt of the APD.
Requirements to be imposed when APD is approved	Developed onsite or within 5 working days thereafter.
Complete processing of APD.	Within 30 days of the APD's receipt, provided that it is technically and administratively complete at the end of the 30-day period (includes the above 15-day and 5-day periods).

NOS OPTION

Action items	Days
Onsite inspection	Within 15 days after receipt of the NOS.
Requirements for inclusion in APD.	Furnished onsite or within 5 working days thereafter.
Complete processing of APD.	Within 10 days of the APD's receipt, provided that it is technically and administratively complete at the end of the 10-day period.

The above timeframes together comprise the total period during which BLM anticipates it will be able to process approximately 90 percent of all APD's. However, the 30 days may not run consecutively even when APD's are filed immediately after onsite inspections. For example, any time used by lessees or operators to correct deficiencies, or to prepare and submit information initially omitted from the application and which causes delays in processing beyond BLM's control, shall not be counted as part of the 30-day period. However, BLM shall continue to process applications up to the point where any missing piece of information or an uncorrected deficiency renders further processing impractical or impossible. Processing delays which extend the 30-day processing time are expected to occur in less than 5 percent of the cases. In addition, delays in conducting onsite inspections within 15 days of receiving an NOS (or an APD if an NOS is not filed), or delays in providing all stipulations to the operator within 5 working days of an onsite inspection may occur in less than 5 percent of the cases during periods of severe weather conditions and in areas where certain environmental concerns or jurisdictional conflicts exist.

Such areas include, but are not limited to:

1. Certain tribally or individually owned Indian trust or restricted lands.

2. Lands withdrawn for Federal reservoirs and Federal lands surrounding such reservoirs.

3. Lands in formally designated wilderness areas, lands formally proposed for such designation, lands within BLM Wilderness Study Areas or lands within Forest Service Further Planning Areas.

4. National Recreation Areas.

5. Wildife Refuges.

6. Certain Federal lands in Alaska.

7. Lands under jurisdiction of the Department of Defense.

8. Lands where a major problem exists with respect to cultural resources.

9. Lands known to contain threatened or endangered species and/or critical habitats.

The 30-day time frame for completion of the APD process also may be exceeded in most cases where it is necessary to prepare an EA, and in all cases where it is necessary to prepare an environmental impact statement (EIS).

Lessees and operators are also cautioned that if the NOS/APD process begins less than 30 days prior to the desired date of commencement of drilling operations, the process may not be completed within the time desired.

E. *Cultural Resources Clearance.* Because consultation with the involved SMA and the State Historic Preservation Officer on matters that relate to the protection of historic and cultural resources is provided in BLM (36 CFR 800.4(a)(1)), lessees and operators should contact the involved SMA at least 15 days prior to the submission of an NOS or APD to determine whether any actions are necessary to locate and identify historic and cultural resources. If such actions are necessary, lessees and operators are encouraged to complete the work and report prior to the submission of any other material to the authorized officer of BLM but, in any event, no later than the time the complete APD is submitted. Survey work and a related report shall be required only if the involved SMA has reason to believe that properties listed, or eligible for listing, in the National Register of Historic Places (NRHP) are present in the area of potential effect. Historic and cultural resources work on privately owned surface shall be undertaken only with the consent of the private surface owner. If the private surface owner refuses entry for that purpose, the lessee or operator shall use its best efforts to conduct its approved operations in a manner that avoids adverse effects on any properties which are listed, or may be eligible for listing, in the NRHP.

F. *Threatened and Endangered Species Clearance and Other Critical Environmental Concerns.* The involved SMA shall identify any threatened and endangered species and/or critical habitat problems and other environmental concerns, e.g., wilderness and wilderness study areas, wild and scenic rivers, etc., to minimize the possibility of drill site relocation. Should the SMA, if that agency is not BLM, be unable to carry out this responsibility, BLM shall do so. BLM shall identify any known or potential surface geological hazards. If any of these concerns exist, information in that regard shall be conveyed to the lessee/operator by BLM no later than when the surface use and reclamation stipulations are provided;

however, the lessee/operator can ensure earlier identification of potential conflict in these areas of concern by contacting the involved SMA prior to the submittal of an NOS or APD. The authorized officer of BLM should be timely apprised of any contacts with any other involved SMA.

G. *Components of a Complete Application for Permit to Drill.*

1. *Complete Application.* If an NOS is filed, the lessee/operator shall prepare and submit a complete APD within 45 days of the onsite inspection pursuant to the requirements of this subsection. Failure to timely submit an APD within this time frame may result in the lessee/operator having to repeat the entire process. The complete APD shall be submitted in triplicate to BLM, together with any additional copies required by the authorized officer. As provided in 43 CFR 3162.3–1(d), formerly 30 CFR 221.23(d), a complete application consists of:

(a) Form 3160–3, (b) a drilling plan (or reference thereto) containing information required by section G.4., below, (c) evidence of bond coverage as required by Department of the Interior regulations, (d) designation of operator, where necessary, and (e) such other information as may be required by applicable Orders and Notices, including a cultural resource report (if required and not already filed). The APD shall be signed by the lessee/operator official having the responsibility and authority to supervise and direct all activities related to the permit and who can be contacted in the event of a problem. The authorized officer may require additional information in unusual circumstances. However, where the proposed well is to be completed for injection purposes (disposal or production enhancement), lessees and operators also shall obtain an underground injection permit from the Environmental Protection Agency (EPA) or the State, where the State has achieved primacy. Any information submitted in support of obtaining that permit shall be accepted by the authorized officer to the extent that it satisfies the information submission requirements of this Order.

2. *Designation of Operator.* The lessee may authorize the actual conduct of operations in its behalf by designating another party as operator in a manner and form acceptable to the authorized officer. Lessees shall notify the authorized officer in writing whenever an existing designation of operator is cancelled. A designated operator cannot designate a different party as operator.

3. *Form 3160–3, formerly 9–331C, (Application for Permit to Drill, Deepen, or Plug Back).* This Form shall be completed in full and submitted to the authorized officer together with all necessary information referred to under section G.1. above. The following points a. through f. are specific as to appropriate information requirements of the Form and shall be stated thereon, or as an attachment thereto, for each proposed well:

a. A well location plat shall be attached depicting the proposed location, as determined by a registered surveyor, in feet and direction from the nearest section lines of an established public land survey or, in areas where there are no public land surveys, by such other method as is acceptable to the authorized officer. The plat shall be signed by the surveyor, certifying that the location has, in fact, been staked on the grounds as shown on the plat.

b. The elevation given shall be the above-sea-level datum of the unprepared ground.

c. The type of drilling tools and associated equipment to be utilized shall be stated.

d. The proposed casing program shall include the size, grade, weight, type of thread and coupling, and setting depth of each string, and whether it is new or used.

e. The amount and type of cement, including additives to be used in setting each casing string, shall be described. If stage-cementing techniques are to be employed, the setting depth of the stage collars and amount and type of cement, including additives, to be used in each stage shall be given. The expected linear fill-up of each cemented string or each stage, when utilizing stage-cementing techniques, shall be provided.

f. The anticipated duration of the total operation shall be given in addition to the anticipated starting date. A copy of the approved Form 3160–3 and the pertinent drilling plan, along with any conditions of approval, shall be available at the drillsite to authorized or delegated representatives of the United States whenever active construction, drilling, or completion operations are under way.

4. *Drilling Plan.* A drilling plan in sufficient detail to permit a complete appraisal of the technical adequacy of, and environmental effects associated with, the proposed project shall be prepared and either submitted with each copy of Form 3160–3, or referenced thereon if it is already on file with BLM or is being submitted for more than one well. The plan shall be developed in conformity with the provisions of the lease, including attached stipulations, and the guidelines provided by this Order or other land use documents. Each drilling plan shall contain a description of the drilling program and surface use program. The BLM shall send a copy of appropriate parts of the plan to any other involved SMA and may send a copy of the plan to other interested Federal, State, and local agencies. All information identified as proprietary by the applicant pursuant to 43 CFR 3162.8, formerly 30 CFR 221.33, shall first be deleted. The drilling program shall include a description of the pressure control system and circulation mediums, the testing, logging and coring program, pertinent geologic data, and information on expected problems and hazards. The drilling program shall be reviewed for adequacy by BLM. The criteria/standards set forth in the operational manual section (currently designated CDM 643.1.3E, Technical Considerations), or in effect at the time of submission of the APD, generally will be utilized in evaluating the technical adequacy of a proposed drilling plan. If the program is considered adequate, BLM shall require modification of the drilling program.

The surface use program shall contain a description of the road and drill pad location and construction methods for containment and disposal of waste material, and other pertinent data as the authorized officer may require. The surface use program shall provide for safe operations, adequate protection of surface resources and uses and other environmental components, and shall, for Federal and Indian surface, include adequate measures for reclamation of disturbed lands no longer needed for either drilling or other subsequent operations. Where the surface is privately owned, the authorized officer may require the submission of the reclamation plan between the lessee or operator and landowner in order to determine if it is adequate to protect nearby Federal and Indian surface from significant impacts generated by the operation. In developing the surface use program, the lessee or operator shall make use of such information as is available from the involved SMA concernng the surface resources and uses, environmental considerations, and local reclamation procedures. The surface use program shall be reviewed for adequacy by BLM and by any other involved SMA. The criteria/standards set forth in the Surface Operating Standards for Oil and Gas Exploration and Development Handbook, Second Edition, August 1978, or as subsequently revised, generally shall be utilized in evaluating the adequacy of a proposed surface use plan. If the surface use program is considered inadequate, BLM

shall, in consultation with any other involved SMA, require modifications or amendment of the program or otherwise set forth stipulations or conditions of approval as are necessary for the protection of surface resources/uses and the environment, and for the reclamation of the areas to be disturbed when no longer needed for operational purposes.

a. *Guidelines for Preparing Drilling Program.* The following information shall be included as part of the drilling plan but shall be made specific to each well if the plan covers more than one well:

(1) Estimated tops of important geologic markers.

(2) Estimated depths at which the top and the bottom of anticipated water (particularly fresh water), oil, gas or other mineral-bearing formations are expected to be encountered and the lessee's or operator's plans for protecting such resources.

(3) Lessee's or operator's minimum specifications for pressure control equipment to be used and a schematic diagram thereof showing sizes, pressure ratings (or API series), and the testing procedures and testing frequency.

(4) Any supplementary information more completely describing the drilling equipment and casing program as set forth on Form 3160–3.

(5) Type and characteristics of the proposed circulating medium or mediums to be employed in drilling, the quantities and types of mud and weighting material to be maintained, and the monitoring equipment to be used on the mud system.

(6) The anticipated type and amount of testing, logging, and coring.

(7) The expected bottom hole pressure and any anticipated abnormal pressures or temperatures or potential hazards, such as hydrogen sulfide, expected to be encountered, along with contingency plans for mitigating such identified hazards.

(8) Any other facets of the proposed operation which the lessee or operator wishes to point out for BLM's consideration of the application.

(b) *Guidelines for Preparing Surface Use Program.* In preparing this program, the lessee or operator shall submit maps, plats, and narrative descriptions which adhere closely to the following (maps and plats should be of a scale no smaller than 1:24,000 unless otherwise stated below):

(1) *Existing Roads.* A legible map (USGS topographic, county road, Alaska Borough, or other such map), labeled and showing the access route to the location, shall be used for locating the proposed well site in relation to a town (village) or other locatable point, such as a highway or county road, which handles the majority of the through traffic to the general area. The proposed route to the location, including appropriate distances from the point where the access route exits established roads, shall be shown. All access roads shall be appropriately labeled. Any plans for improvement and/or a statement that existing roads will be maintained in the same or better condition shall be provided. Existing roads and newly constructed roads on surface under the jurisdiction of an SMA shall be maintained in accordance with the standards of the SMA.

Information required by items (2), (3), (4), (5), (6), and (8) of this subsection also may be shown on this map if appropriately labeled or on a separate plat or map.

(2) *Access Roads to Be Constructed and Reconstructed.* All permanent and temporary access roads that are to be constructed, or reconstructed, in connection with the drilling of the proposed well shall be appropriately identified and submitted on a map or plat. Width, maximum grade, major cuts and fills, turnouts, drainage design, location and size of culverts and/or bridges, fence cut and/or cattleguards, and type of surfacing material, if any, shall be stated for all construction. In addition, where permafrost exists, the methods for protection from thawing must be indicated. Modification of proposed road design may be requird during the onsite inspection.

Information also should be furnished to indicate where existing facilities may be altered or modified. Such facilities include gates, cattleguards, culverts, and bridges which, if installed or replaced, shall be designed to adequately carry anticipated loads.

(3) *Location of Existing Wells.* It is recommended that this information be submitted on a map or plat and include all wells (water, injection or disposal, producing, and drilling) within a 1-mile radius of the proposed location.

(4) *Location of Existing and/or Proposed Facilities if Well Is Productive.*

(a) *On well pad*—A map or plat shall be included showing, to the extent known or anticipated, the location of all production facilities and lines to be installed if the well is successfully completed for production.

(b) *Off well pad*—A map or plat shall be included showing to the extent known or anticipated, the existing or new production facilities to be utilized and the lines to be installed if the well is successfully completed for production. If new construction, the dimensions of the facility layout are to be shown.

If the information required under (a) or (b) above is not known and cannot be accurately presented and the well subsequently is completed for production, the operator shall then comply with section IV. of this Order.

(5) *Location and Type of Water Supply (Rivers, Creeks, Springs, Lakes, Ponds, and Wells).* This information may be shown by quarter-quarter section on a map or plat, or may be a written description. The source and transportation method for all water to be used in drilling the proposed well shall be noted if the source is located on Federal or Indian lands or if water is to be used from a Federal or Indian project. If the water is obtained from other than Federal or Indian lands, only the location need be identified. Any access roads crossing Federal or Indian lands that are needed to haul the water shall be described in items G.4.b. (1) and (2), as appropriate. If a water supply well is to be drilled on the lease, it shall be so stated under this item, and the authorized officer of BLM may require the filing of a separate APD.

(6) *Construction Materials.* The lessee or operator shall state the character and intended use of all construction materials, such as sand, gravel, stone and soil material. If the materials to be used are Federally-owned, the proposed source shall be shown by either quarter-quarter section on a map or plat, or a written description. The use of materials under BLM jurisdiction is governed by 43 CFR 3610.2–3. The authorized officer shall inform the lessee or operator if the materials may be used free of charge or if an application for sale is required. If the materials to be used are Indian owned or under the jurisdiction of SMA other than BLM, the specific tribe and or Area Superintendent of BIA, or the appropriate SMA office shall be contacted to determine the appropriate procedure for use of the materials.

(7) *Methods for Handling Waste Disposal.* A written description shall be given of the methods and locations proposed for safe containment and disposal of each type of waste material (e.g., cuttings, garbage, salts, chemicals, sewage, etc.) that results from the drilling of the proposed well. Likewise, the narrative shall include plans for the eventual disposal of drilling fluids and any produced oil or water recovered during testing operations.

(8) *Ancillary Facilities.* The plans, or subsequent amendments to such plans, shall identify all ancillary facilities such as camps and airstrips as to their location, land area required, and the

methods and standards to be employed in their construction. Such facilities shall be shown on a map or plat. The approximate center of proposed camps and the center line of airstrips shall be staked on the ground.

(9) *Well Site Layout.* A plat of suitable scale (not less than 1 inch = 50 feet) showing the proposed drill pad and its location with respect to topographic features is required. Cross section diagrams of the drill pad showing any cuts and fills and the relation to topography are also required. The plat shall also include the proposed location of the reserve and burn pits, access roads onto the pad, turnaround areas, parking areas, living facilities, soil material stockpiles, and the orientation of the rig with respect to the pad and other facilities. Plans, if any, to line the reserve pit shall be detailed.

(10) *Plans for Reclamation of the Surface.* The program for surface reclamation upon completion of the operation, such as configuration of the reshaped topography, drainage system, segregation of spoils materials, surface manipulations, waste disposal, revegetation methods, and soil treatments, plus other practices necessary to reclaim all disturbed areas, including any access roads or portions of well pads when no longer needed, shall be stated. An estimate of the time for commencement and completion of reclamation operations, dependent on weather conditions and other local uses of the area, shall be provided.

(11) *Surface Ownership.* The surface ownership (Federal, Indian, State or private) at the well location, and for all lands crossed by roads which are to be constructed or upgraded, shall be indicated. Where the surface of the well site is privately owned, the operator shall provide the name, address and telephone number of the surface owner, unless previously provided.

(12) *Other Information.* The lessee or operator is encouraged to submit any additional information that may be helpful in processing the application.

(13) *Lessee's or Operator's Representative and Certification.* The name, address and telephone number of the lessee's or operator's field representative shall be included. The lessee or operator submitting the APD shall certify as follows:

I hereby certify that I, or persons under my direct supervision, have inspected the proposed drill site and access route; that I am familiar with the conditions which currently exist; that the statements made in this plan are, to the best of my knowledge, true and correct; and that the work associated with operations proposed herein will be performed by ———— and its contractors and subcontractors in conformity with this plan and the terms and conditions under which it is approved. This statement is subject to the provisions of 18 U.S.C. 1001 for the filing of a false statement.

Date ————.
Name and Title ————.

5. *Environmental Review Requirements.*

When an onsite inspection is conducted, it shall be made by representatives of the authorized officer and the operator, and other interested parties such as the involved SMA, the appropriate Alaska Borough (when a subsistence stipulation is part of the lease), and the operator's principal (construction and drilling) contractors. It is recommended that, when appropriate, the operator's surveyor and archeologist should also participate in the inspection. The purpose of this inspection shall be to ensure the staked location, access roads and other areas proposed for surface disturbance are geologically and environmentally acceptable, giving appropriate consideration to all applicable Federal laws and regulations. Lessees and operators are encouraged to designate their future drilling sites so that several locations may be inspected at one time.

a. *Federal Responsibilities.* When an inspection is made, the information obtained shall be utilized by BLM in appraising the environmental effects associated with the proposed action and in preparing pertinent portions of the required environmental documentation. As the approving agency, BLM has the lead responsibility for completing the environmental review process and establishing the terms and conditions under which the proposed action may be approved. The conduct of the environmental review process, under the Department of the Interior's implementing procedures pursuant to the National Environmental Policy Act, will result in the preparation of a Record of Review (ROR) and/or an EA, consistent with pertinent regulations and procedures. This review shall identify the probable and potential environmental impacts associated with the proposal and methods for mitigating these impacts and shall be the basis of the approving official's determination as to whether approval of the proposed activity would or would not constitute a major Federal action significantly affecting the quality of the human environment as defined by section 102(2)(C) of the National Environmental Policy Act of 1969. A "would constitute" determination shall necessitate the preparation of an EIS. In that case, final action on the APD shall not be taken until the EIS and Record of Decision are completed.

b. *Other Considerations.* Lessees and operators are strongly encouraged to file their NOS and/or complete APD at least 30 days in advance of the time when they wish to commence operations and to consult with the involved SMA as early as possible to identify potential areas of concern (see sections III. E. and F.).

IV. *Subsequent Operations.*

Subsequent operations shall be conducted in accordance with 43 CFR Part 3160, formerly 30 CFR 221. However, where the proposed subsequent operation will result in the well being converted for injection purposes (disposal or production enhancement), lessees and operators also shall obtain an underground injection permit from EPA or the State, where the State has achieved primacy. Any information submitted in support of obtaining that permit shall be accepted by the authorized officer of BLM to the extent that it satifies the information submittal requirements of this Order.

A. *Well and Production Operations.*

Before conducting further well operations that involve change in the original plan, a detailed written statement of the work shall be filed on Form 3160–5 or 3160–3 , as appropriate, with the authorized officer and approval obtained before the work is started. These operations include redrilling, deepening, performing casing repairs, plugging-back, altering casing, performing nonroutine fracturing jobs, recompleting in a different interval, performing water shut-off, and converting to injection or disposal. Within 30 days of the completion of such operations, a subsequent report shall be filed on Form 3160–5 and, if the well is recompleted, a recompletion report on Form 3160–4, pursuant to 43 CFR 3162.3–2 and the information collection approval note, formerly 30 CFR 221.27 and 221.2–1.

Unless additional surface disturbance is involved and so long as the operations conform to the standard of prudent operating practice, no prior approval is required for routine fracturing or acidizing jobs, or recompletion in the same interval, but a subsequent report of these operations shall be filed on Form 3160–5, formerly 9–331, within 30 days of completion, pursuant to 43 CFR 3162–2.3 and the information collection approval note, formerly 30 CFR 221.27 and 221.2–1.

Neither prior approval nor a subsequent report is required for well

clean-out work, routine well maintenance (such as pump, rods, and tubing work), or for repair, replacement, or modification of surface production equipment, provided no additional surface disturbance is involved. However, the modification of any production, treating, and measurement facilities shall require the submission of a revised schematic diagram within 30 days of the completion of such operations, pursuant to 43 CFR 3162.7–2, formerly 30 CFR 221.34.

B. *Surface Disturbing Operations.* Pursuant to 43 CFR 3162.3–2 and 3162.3–3, formerly 30 CFR 221.27 and 221.28, lessees and operators shall submit, for the approval of the authorized officer, a proposed plan of operations on Form 3160–5 prior to undertaking any subsequent new construction, reconstruction, or alteration of existing facilities including, but not limited to, roads, emergency pits, firewalls, flowlines, or other production facilities on any lease when additional surface disturbance will result. If, at the time the original APD was filed, the lessee or operator elected to defer submitting information for item III.G.4.b.(4), "Location of Existing and/or Proposed Facilities if Well is Productive," the lessee or operator shall supply this information for approval prior to construction and installation of the facilities. The authorized officer, in consultation with any other involved SMA, may require a field inspection before approving the proposal.

C. *Emergency Repairs.* Emergency repairs may be conducted without prior approval provided that the authorized officer is promptly notified. Sufficient information shall be submitted to permit a proper evaluation of any resultant surface disturbing activities as well as any planned accommodations necessary to mitigate potential adverse environmental effects.

D. *Environmental Review.* The environmental review procedures discussed in section III.G.5. of this Order shall also apply to subsequent operations which involve additional surface disturbance.

V. *Well Abandonment.* No well abandonment operations may be commenced without the prior approval of the authorized officer. In the case of newly drilled dry holes or failures and in emergency situations, oral approval may be obtained from the authorized officer subject to prompt written confirmation. For old wells not having an approved abandonment plan, a sketch showing the disturbed area and roads to be abandoned, along with the proposed reclamation measures, shall be submitted with Form 3160–5. On Federal and Indian surface, the appropriate SMA may request additional reclamation measures at abandonment, which normally shall be made a part of BLM's approval of abandonment. Within 30 days following completion of the well abandonment, the lessee or operator shall file with the authorized officer of BLM a Subsequent Report of Abandonment on Form 3160–5, in accordance with 43 CFR Part 3160, formerly 30 CFR Part 221. Upon completion of reclamation operations, the lessee or operator shall notify the authorized officer when the location is ready for inspection, via an additional Form 3160–5. Final abandonment shall not be approved until the surface reclamation work required by the approved drilling permit or approved abandonment notice has been completed to the satisfaction of the involved SMA.

VI. *Water Well Conversion.* The complete abandonment of a well which has encountered usable fresh water shall not be approved if the SMA or surface owner wants to acquire the well. If, at abandonment, the SMA or surface owner elects to assume further responsibility for the well, the SMA or surface owner, as appropriate, shall reimburse the lessee or operator for the cost of any recoverable casing or wellhead equipment which is to be left in or on the hole solely because it is to be completed as a water well. The lessee or operator shall abandon the well to the base of the deepest fresh water zone of interest, as required by the authorized officer, and shall complete the surface cleanup and reclamation, as required by the approved drilling permit or approved abandonment notice, immediately upon completion of the conversion operations.

VII. *Privately Owned Surface.*—A. *Federal oil and gas leases.* Where the well site and access road surface are privately owned or are held in trust for Indian benefit, the lessee or operator is responsible for reaching an agreement with BIA or the private surface owner as to the requirements for the protection of surface resources and reclamation of disturbed areas and/or damages in lieu thereof. However, if the authorized officer or any other involved SMA determines that the surface of Federal or Indian-owned lands in proximity to the proposed well site or access road on private surface will be significantly affected, the lessee or operator may be required to furnish a copy of any existing agreement between the lessee or operator and the surface owner to the authorized officer. If the agreement on private surface is considered inadequate to protect the surface of adjacent Federal or Indian-owned lands, the authorized officer or other involved SMA may prescribe additional measures to protect the adjacent Federal or Indian lands. In the event there is no agreement between the surface owner and the operator, the operator may comply with the provisions of the law or the regulations governing the Federal or Indian right of reentry to the surface (See Subpart 3814 of this title) and the authorized officer may then proceed to issue the permit.

B. *Indian oil and gas leases.* Where the well site and access road surface are privately owned or are held in trust for an Indian or Indian tribe other than the owner of the oil and gas rights, the lessee or operator is responsible for reaching an agreement with the surface owner (or the BIA if the surface is held in trust for numerous or unlocatable Indian owners) as to the requirement for the protection of surface resources and reclamation of disturbed areas and/or damages in lieu thereof. However, if the authorized officer or any other involved SMA determines that the surface of

Federal or Indian-owned lands in proximity to the proposed well site or access road on private surface will be significantly affected, the lessee or operator may be required to furnish the authorized officer a copy of any existing agreement between the lessee or operator and the surface owner. If the agreement on private surface is considered inadequate to protect the surface of adjacent Federal or Indian-owned lands, the authorized officer or other involved SMA may prescribe additional measures to protect the adjacent Federal or Indian-owned lands. In the event there is no agreement between the surface owner and the operator, the authorized officer may permit the operator to conduct operations if he/she determines that: (1) a good faith effort has been made by the operator to reach agreement with the surface owner; (2) adequate security is posted, in the form of a bond, escrow account or by other means, to compensate the surface owner for any damages; and (3) there is no legal obstacle to conducting operations in the absence of surface owner consent.

VIII. *Reports and Activities Required After Well Completion.* Within 30 days after the well completion, the lessee or operator shall furnish 2 copies of Form 3160–4, formerly 9–330 (Well Completion or Recompletion Report and Log) to the authorized officer. However, no later than the fifth business day after any well begins production anywhere on a lease site or allocated to a lease site, or resumes production in the case of a well that has been off production for more than 90 days, the lessee or operator shall notify the authorized officer of the date on which production has begun or resumed.

The notification may be provided orally if promptly confirmed in writing.

Dated: August 9, 1983.

Jeffrey F. Zabler,

Acting Assistant Director for Fluid Leasable Minerals.

Approved:

Dated: August 17, 1983.

Arnold E. Petty,

Acting Associate Director, Bureau of Land Management.

BILLING CODE 4310-84-M

Attachment A

SAMPLE FORMAT

NOTICE OF STAKING (Not to be used in place of Application for Permit to Drill Form 3160-3)	6. Lease Number
1. Oil Well ☐ Gas Well ☐ Other (Specify)	7. If Indian, Allottee or Tribe Name
2. Name of Operator:	8. Unit Agreement Name
3. Name of Specific Contact Person:	9. Farm or Lease Name
4. Address & Phone No. of Operator or Agent	10. Well No.
5. Surface Location of Well Attach: a) Sketch showing road entry onto pad, pad dimensions, and reserve pit. b) Topographical or other acceptable map showing location, access road, and lease boundaries.	11. Field or Wildcat Name 12. Sec., T., R., M., or Blk and Survey or Area

15. Formation Objective(s)	16. Estimated Well Depth	13. County, Parish or Borough	14. State

17. Additional Information (as appropriate; must include surface owner's name, address, and telephone number)

18. Signed_____ Title_____ Date_____

Note: Upon receipt of this Notice, the Bureau of Land Management (BLM) will schedule the date of the onsite predrill inspection and notify you accordingly. The location must be staked and access road must be flagged prior to the onsite.

Operators must consider the following prior to the onsite:

a) H_2S Potential
b) Cultural Resources (Archeology)
c) Federal Right of Way or Special Use Permit

IMPORTANT: SEE REVERSE SIDE FOR INSTRUCTIONS

BILLING CODE 4310-84-C

Instructions for Preparation of Attachment A

General: This provides notice to the Bureau of Land Management (BLM) that staking has been (or will be) completed for well locations on Federal or Indian leases and serves as a request to schedule an onsite inspection. The original and one copy of this notice, together with a map and sketch, should be submitted to the appropriate BLM office.

Any item not completed may be justification for not promptly scheduling the onsite inspection.

Specific Considerations: Items included herein should be reviewed and evaluated thoroughly prior to the onsite. These items affect placement of location, road, and facilities. Failure to be prepared with complete, accurate information at the onsite may necessitate later re-evaluation of the site and an additional onsite inspection.

a. H_2S Potential: Prevailing winds, escape routes, and placement of living quarters must be considered.

b. Cultural Resources: Archeological surveys, if required, should be done prior to, during or immediately following the onsite. Changes in location due to subsequent archeological findings may require an additional onsite. Contact involved Surface Management Agency (SMA) for detailed site specific requirements.

c. Federal Right-of-Way or Special Use Permit: Access roads outside the leasehold boundary which cross Federal lands will require a right-of-way grant or special use permit and should be discussed with the BLM or other involved SMA at the time of filing the Notice of Staking.

Supplemental Checklist: The following items, if applicable, should be submitted with or prior to the Application For Permit to Drill (APD) to ensure timely approval of the application. Contact the BLM regarding specific requirements relating to each item.

a. Bonding.

b. Designation of Operator.

c. Report of Cultural Resources/ Archeology.

d. H_2S Contingency Plan.

e. Status of Plan of Development and Designation of Agent for wells in Federal units.

f. Federal Right-of-Way (BLM) or Special Use Permit (Forest Service).

Timetable: The onsite inspection will be scheduled and conducted by the BLM within 15 days after receipt of this notice. Surface protection and rehabilitation requirements will be made known to the operator by the BLM during the onsite or no later than 5 working days from the date of inspection, barring unusual circumstances. These requirements are to be incorporated into the complete APD. However, this does not exclude the possibility of additional conditions of approval being imposed.

Attachment B

Date:— ————————————

Bureau of Land Management

Checklist for Applicant Notification

Receipt and Acceptability of Application for Permit To Drill (APD)

Lease No.————————
Well No.————————
Lessee————————
Operator————————
Date APD Received————————

1.—APD complete as submitted.

2.—APD is deficient in the following area(s) *and* (see items 3, 4, or 5 below):

—Designation of Operator
—Designation of Agent under————————unit agreement
—Bonding
—Cultural Resources Report (depends on Federal Surface Management Agency's Requirements
—Form 9–331C
—Drilling Plan
—Other

(Refer to attachment(s) for any specifics)

3.—APD is retained; to be processed upon receipt of further information as noted above.

4.—APD is being processed; final action pending receipt of further information as noted above.

5.—APD is returned for the following reasons:————————

————————————————

————————————————

Note:— A returned APD herewith may be resubmitted when convenient at which time it will be reviewed again for technical and administrative completeness.

A retained but deficient APD must be brought to a technically and administratively acceptable level of completion within 45 days of the date of this notice or the application will be returned unapproved.

[FR Doc. 83–28642 Filed 10–20–83; 8:45 am]
BILLING CODE 4310–84–M

Exhibit No. 3

U.S. DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
Jackson Mall Office Center
300 Woodrow Wilson Drive, Suite 326
Jackson, Mississippi 39213

Telephone Numbers:

U. J. Parikh: (601) 965-4405 (Work)
(601) 825-7272 (Home)
Ray Boteler: (601) 845-8095 (Home)
John Duhon: (601) 856-8289 (Home)

Above data required on well sign for drilling and production

CONDITIONS FOR DRILLING APPROVAL (Jackson District)

1. SPUD DATE AND DAILY PROGRESS REPORT: Report daily drilling status by telephone, starting from the spud date until completion. This is to be followed with weekly summaries by mail.

2. PLUGGING OR PLAN CHANGE: The operator must obtan an approval prior to changing the drilling plans or plugging the well. Requests for approval of these operations are made by submitting a completed BLM Form 3160-5 and any required attachments in triplicate. Notify the BLM authorized officer sufficiently in advance so he/she may witness plugging, plugging back, formation tests, water shutoff tests, and running and cementing casing, other than conductor string.

3. REQUIRED DATA: Upon completion submit one copy each of Well Completion Report, BLM Form 3160-4, drill stem test data, core description and analysis, geophysical logs, directional surveys, or any other data compiled.

4. You are required to contact: _____
_____
prior to commencing any surface disturbance.

5. DRILLING DEADLINE: This approval is good for one (1) year. renewal is required if operations are not commenced within (1) year.

6. SPILLS, BLOWOUTS, FIRES, AND ACCIDENTS: Immediately report to this office and the surface management agency in accordance with NTL-3A.

7. ARCHAEOLOGICAL SITES: If archaeological sites are encountered, shut down operations and notify this office at once.

8. PRODUCED WATER: If this well is completed as a producer, submit an application for disposal of produced water immediately as required in NTL-2B.

9. PRODUCTION FACILITIES: If the well becomes a producer, approval by this office will be required before installing on or off leasehold flow lines, tank batteries, measurement, or disposal facilities.

10. POSTING: A copy of this permit must be posted in a conspicuous place on the drilling rig.

11. NOTIFICATION OF PRODUCTION: Section 101(b)(3) of the Federal Oil and Gas Royalty Management Act of 1982, as implemented by the applicable provisions of the operating regulations of Title 43 CFR 3162.4-1(c), requires that "Not later than the 5th business day after any well begins producion on which royalty is due anywhere on a lease site or allocated to a lease site, or resumes producton in the case of a well which has been off production for more than 90 days, the operator shall notify the authorized officer by letter or Sundry Notice, BLM Form 3160-5, or orally to be followed by a letter or Sundry Notice, of the date on which such production has begun or resumed".

    The date on which production is commenced or resumed will be construed for oil wells as the date on which liquid hydrocarbons are first sold or shipped from a temporary storage facility, such as a test tank, and for which a run ticket is required to be generated or, the date on which liquid hydrocarbons are first produced into a permanent storage facility, whichever first occurs; and, for gas wells as the date on which associated liquid hydrocarbons are first sold or shipped from a temporary storage facility, such as a test tank, and for which a run ticket is required to be generated or, the date on which gas is first measured through permanent metering facilities, whichever first occurs.

    If you fail to comply with this requirement in the manner and time allowed, you shall be liable for a civil penalty of up to $10,000 per violation for each day such violation continues, not to exceed a maximum of 20 days. See Section 109(c)(3) of the Federal Oil and Gas Royalty Management Act of 1982 and the implementing regulations of Title 43 CFR 3163.4-1(5)(ii).

12. Approval of this application does not warrant or certify that the applicant holds legal or equitable title to those rights in the subject lease which would entitle the applicant to conduct operations thereon.

13. CERTIFICATION: The original and one copy of these conditions are enclosed. Please certify that you have read these conditions by signing the copy and return it in the enclosed return envelope.

Authorized Signature	Title	Date

Appendix 2

SMCRA SECTIONS ON HISTORIC PROPERTIES

APPENDIX
COAL UNSUITABILITY CRITERIA

A May 24, 1977, presidential memorandum instructed the Secretary of the Interior to lease only those areas where coal mining is environmentally acceptable and compatible with other land uses. In addition, the Surface Mining Control and Reclamation Act of 1977 (SMCRA) required the Secretary to review federal lands to determine whether they contained areas unsuitable for all or certain types of surface coal mining. SMCRA also requires the states to undertake a similar program for nonfederal lands if they wish to assume primary regulatory authority under the act. A list of standards to be used by the states is presented in Section 522(a)(3) of SMCRA. These same standards must also be applied to federal lands as well as to private surface lands overlying federal coal.

The coal unsuitability criteria were developed to implement SMCRA, other federal laws, and the directives in the President's Environmental Message of May 23, 1979. The criteria aid land managers in identifying those areas with key features and environmental sensitivities that cannot properly be protected if subjected to mining. Applying the unsuitability criteria ensures that the most sensitive and valuable environmental features of federal lands are protected in a consistent, uniform, and objective manner so that coal development planning is concentrated in areas where environmental conflicts are less likely to add delay, cost, or conflict to production efforts.

The unsuitability criteria (exceptions and exemptions not listed) protect the following lands and resources:

1. All federal land included in the following land systems or categories: National Park System, National Wildlife Refuge System, National System of Trails, National Wilderness Preservation System, National Wild and Scenic Rivers System, national recreation areas, lands acquired with money derived from the Land and Water Conservation Fund, and federal lands in incorporated cities, towns, and villages.

2. Federal lands within rights-of-way or easements or included in surface leases for residential, commercial, industrial, or other public purposes.

3. Lands within 100 feet of the outside line of the right-of-way of a public road; within 100 feet of a cemetery; within 300 feet of any public building, school, church, community, or public park; or within 300 feet of an occupied building.

4. Federal lands being reviewed for possible wilderness designation.

5. Scenic federal lands designated by visual resource management analysis as Class 1 (areas of outstanding scenic quality or high visual sensitivity).

6. Federal lands under permit by the surface management agency that are being used for scientific studies involving food and fiber production, natural resources, or technology demonstrations and experiments (except where mining could be conducted in such ways as to enhance, not jeopardize, the purposes of the study).

7. All publicly owned districts, sites, buildings, structures, and objects of historic, architectural, archaeological of cultural significance on federal lands that are listed on the National Register of Historic Places, and an appropriate buffer zone around the designated property.

8. Federal lands designated as natural areas or as national natural landmarks.

9. Federally-designated critical habitat for threatened or endangered plant or animal species and habitat for federal threatened or endangered species that is determined by the U.S. Fish and Wildlife Service and the surface management agency to be of essential value and where the presence of threatened or endangered species has been scientifically documented.

10. Federal lands with habitat determined to be critical or essential for plant or animal species listed by a state pursuant to state law as endangered or threatened.

11. An active bald or golden eagle nest site on federal lands and an appropriate buffer zone around the nest site.

12. Bald and golden eagle roost and concentration areas on federal lands used during migration and wintering.

13. Federal lands containing an active falcon (excluding kestrel) cliff-nesting site and a buffer zone of federal land around the nesting site.

14. Federal lands that are high priority habitat for migratory bird species of high federal interest on a regional or national basis as determined jointly by the surface management agency and the U.S. Fish and Wildlife Service.

15. Federal lands that the surface management agency and the state jointly agree are fish and wildlife habitat for resident species of high interest to the state and that are essential for maintaining these priority wildlife species.

16. Federal lands in riverine, coastal, and special floodplains (100-year recurrence interval) where mining could not be undertaken without substantial risk of loss of life or property.

17. Federal lands that have been committed by the surface management agency to use as municipal watersheds.

18. Federal lands with national resource waters as identified by states in their water quality management plans and a 1/4-mile wide buffer zone of federal land.

19. Federal lands identified by the surface management agency in consultation with the state as alluvial valley floors where mining would interrupt, discontinue, or preclude farming.

20. Federal lands in a state to which applies a criterion (1) proposed by that state and (2) adopted by rulemaking by the Secretary of the Interior.

SMCRA mandates that the Secretary of the Interior review all federal lands for unsuitability and that citizens be allowed to petition for and against designation of lands as unsuitable. Consequently, under SMCRA, the Department of the Interior has procedures to apply unsuitability criteria both as part of a comprehensive federal lands review and as part of a petition process.

Unsuitability criteria are applied for unleased lands during land use planning and for leased lands during surface mining permit application, as described in Chapter 1. SMCRA has one more unsuitability criterion that is not included in the regulations. Section 522(a)(2) requires that lands be deemed unsuitable for all or certain types of surface coal mining if reclamation under the requirements of SMCRA is not technologically and economically feasible. In the decision that established the coal program after completion of the 1979 PEIS, Secretary of the Interior Andrus determined that this criterion is most efficiently and appropriately applied at the surface mining permit application stage rather than during land use planning. Reclaimability is, in fact, considered at various points throughout land use and activity planning. The formal review under Section 522(a)(2), however, is encompassed within the surface mining permit review process. As SMCRA requires, federal lands review is conducted during land use planning to the extent possible, and the remaining portion is conducted during the surface mining permit application review.

The Office of Surface Mining Reclamation and Enforcement (OSM) has the responsibility of administering the statutory unsuitability petition process. OSM will make a formal designation of federal lands as unsuitable only in response to a petition to designate under Section 522(c) of SMCRA. Anyone can submit either of two kinds of petitions. One is a petition to designate land unsuitable for mining. The other is a petition to terminate a designation of unsuitability. Section 522 of SMCRA requires that the petitioner be adversely affected by potential mining of the lands in question and provide facts supporting the allegation.

Petitions submitted will be reviewed by OSM in consultation with the surface managing agency and then returned with recommendations to the authorized surface management agency. A public hearing will later be held to present to the public the reviews of the OSM and the surface management agency. These reviews will describe (1) potential coal resources of the area; (2) the demand for coal resources; and (3) the impact of such designation on the environment, the economy, and the supply of coal. A decision to designate land unsuitable, to reject the petition, or to terminate a prior designation will occur within 60 days of the hearing.

Appendix 3

SHPO LETTER EVALUATING SITE POTENTIAL OF P.D. TRACTS

EDWIN W. EDWARDS
GOVERNOR
NOELLE LEBLANC
SECRETARY

State of Louisiana

DEPARTMENT OF CULTURE, RECREATION AND TOURISM
OFFICE OF CULTURAL DEVELOPMENT
ROBERT B. DEBLIEUX
ASSISTANT SECRETARY

DIVISION OF ARCHAEOLOGY
KATHLEEN BYRD, DIRECTOR
DIVISION OF THE ARTS
ALBERT B. HEAD, DIRECTOR
DIVISION OF HISTORIC PRESERVATION
ANN REILEY JONES, DIRECTOR
FOLKLIFE PROGRAM
NICHOLAS R. SPITZER,
PROGRAM MANAGER

960

August 23, 1985

Mr. G. Curtis Jones, Jr.
U. S. Department of the
Interior
Bureau of Land Management
350 South Pickett Street
Alexandria, VA 22304

Re: Request for Planning Data - 8100 (963)

Dear Mr. Jones:

In response to your letter of July 17, 1985, we have the following information to offer.

To the best of our knowledge, there are no sites or properties either listed in the National Register of Historic Places or which have been determined eligible for listing in the National Register of Historic Places located within or near the subject tracts. We are enclosing a booklet listing National Register properties in Louisiana for your information (Enclosure A).

Of the 56 tracts of land on your list, we have recorded archaeolgical sites on two (Tracts 4 & 5). In addition, we have an archaeological site recorded near Tract # 32 (see attached maps for site locations and State Survey numbers - Enclosure B). For a list of the subject tracts with our assessment of site probability and survey recommendations, see Enclosure C. Finally, for a breakdown of historic and prehistoric sites by parish in the State of Louisiana, please refer to Table I-V in Louisiana's Comprehensive Archaeological Plan (Enclosure D). You may find other data in this volume useful for planning purposes.

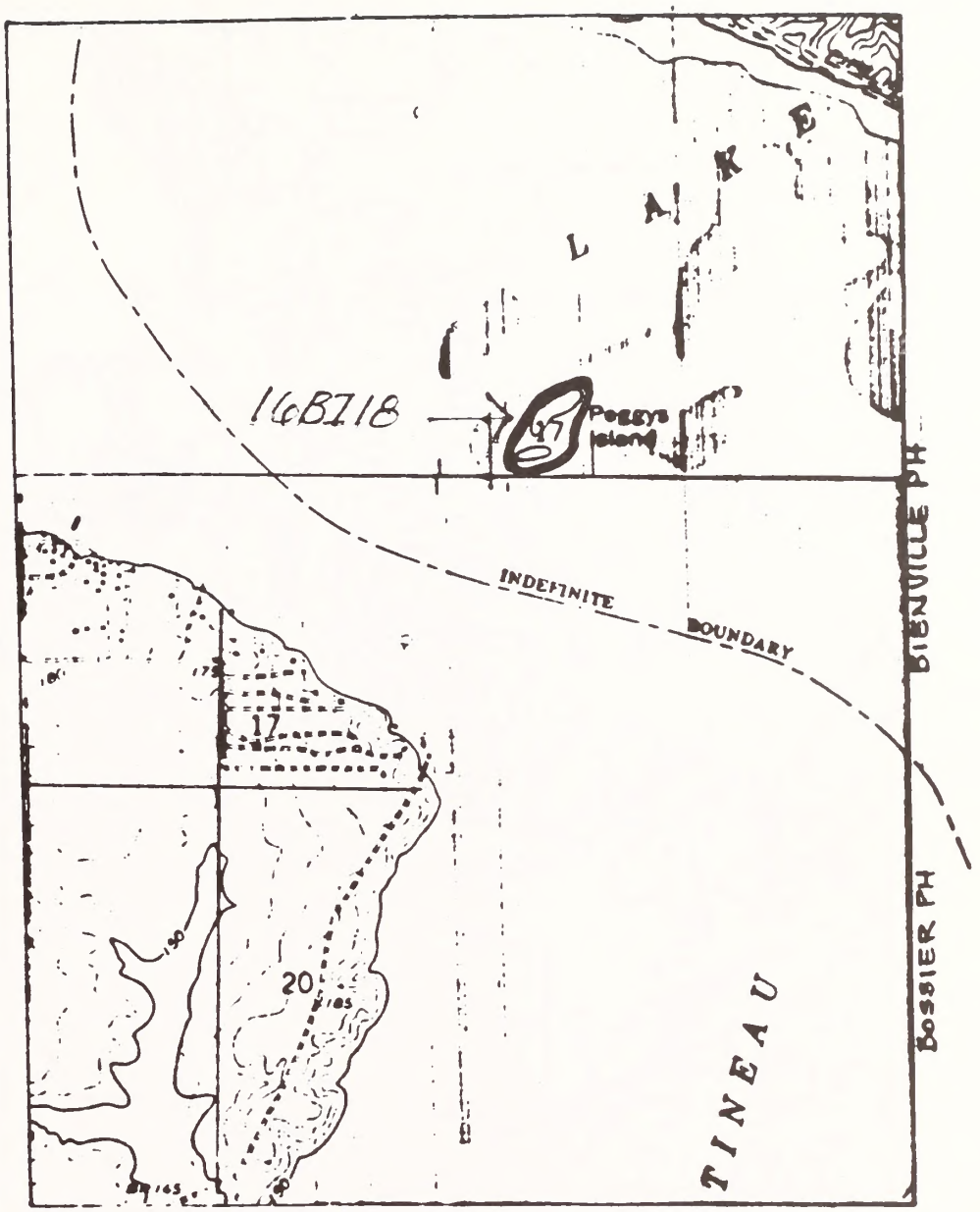
If we may be of further assistance, do not hesitate to contact my staff in the Division of Archaeology.

Sincerely,

Robert B. DeBlieux
State Historic Preservation Officer

RBD:PGR:tb

Enclosures: As stated



LB5093

Scale 1:24,000

Public Lands Louisiana Tract 4

PERTINENT INFORMATION

Section: 17

Legal Description: Lot 1

Township and Range: T.16N., R.10W.

Louisiana Meridian

Acreage: 1.75

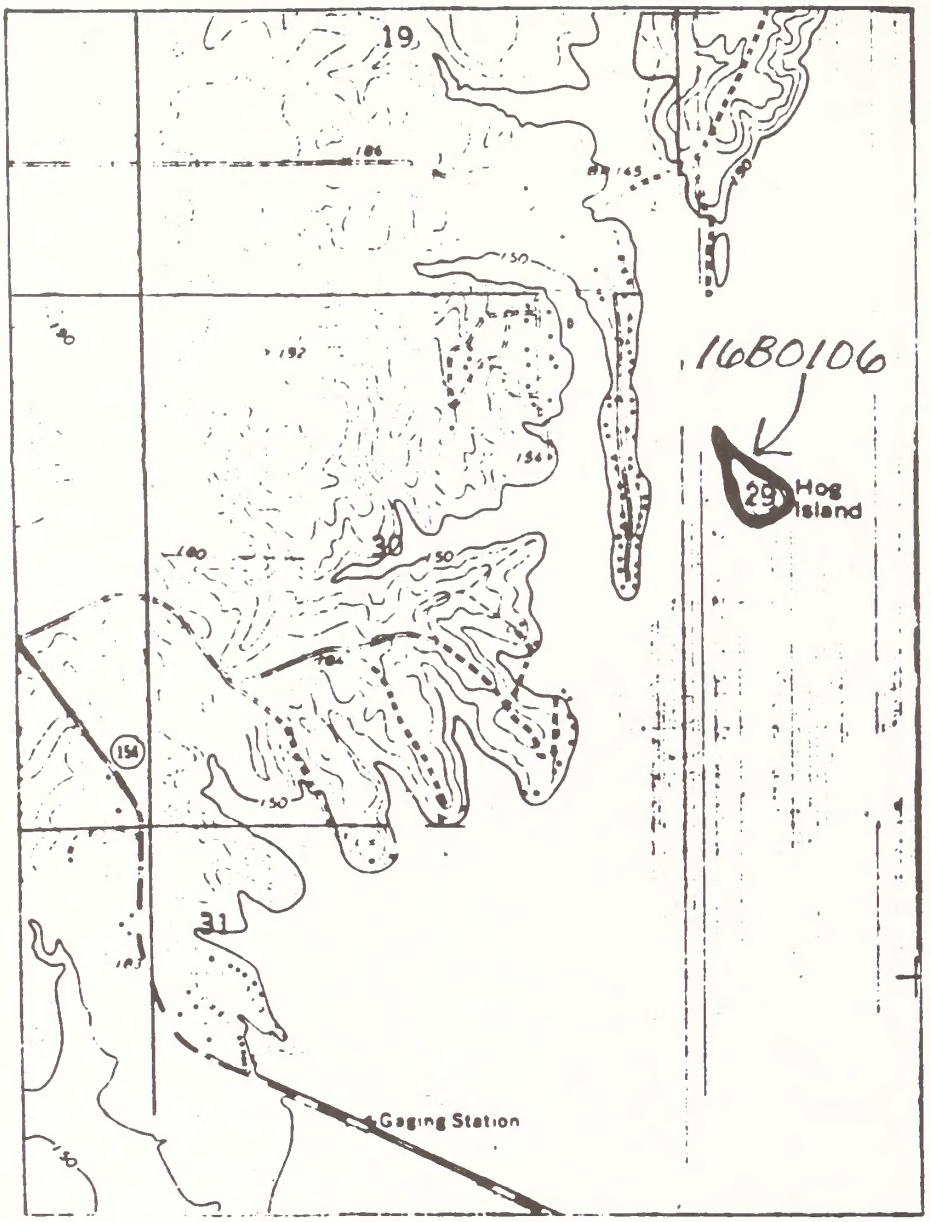
County or Parish: Bienville

Quadrangle Name: Koran 7½' Bossier Point 7½' c

State: Louisiana

Case No.:

Date: 7-1-85 By: OEB



LB5093

Scale: 1:24,000 Public Lands Louisiana Tract 5

PERTINENT INFORMATION

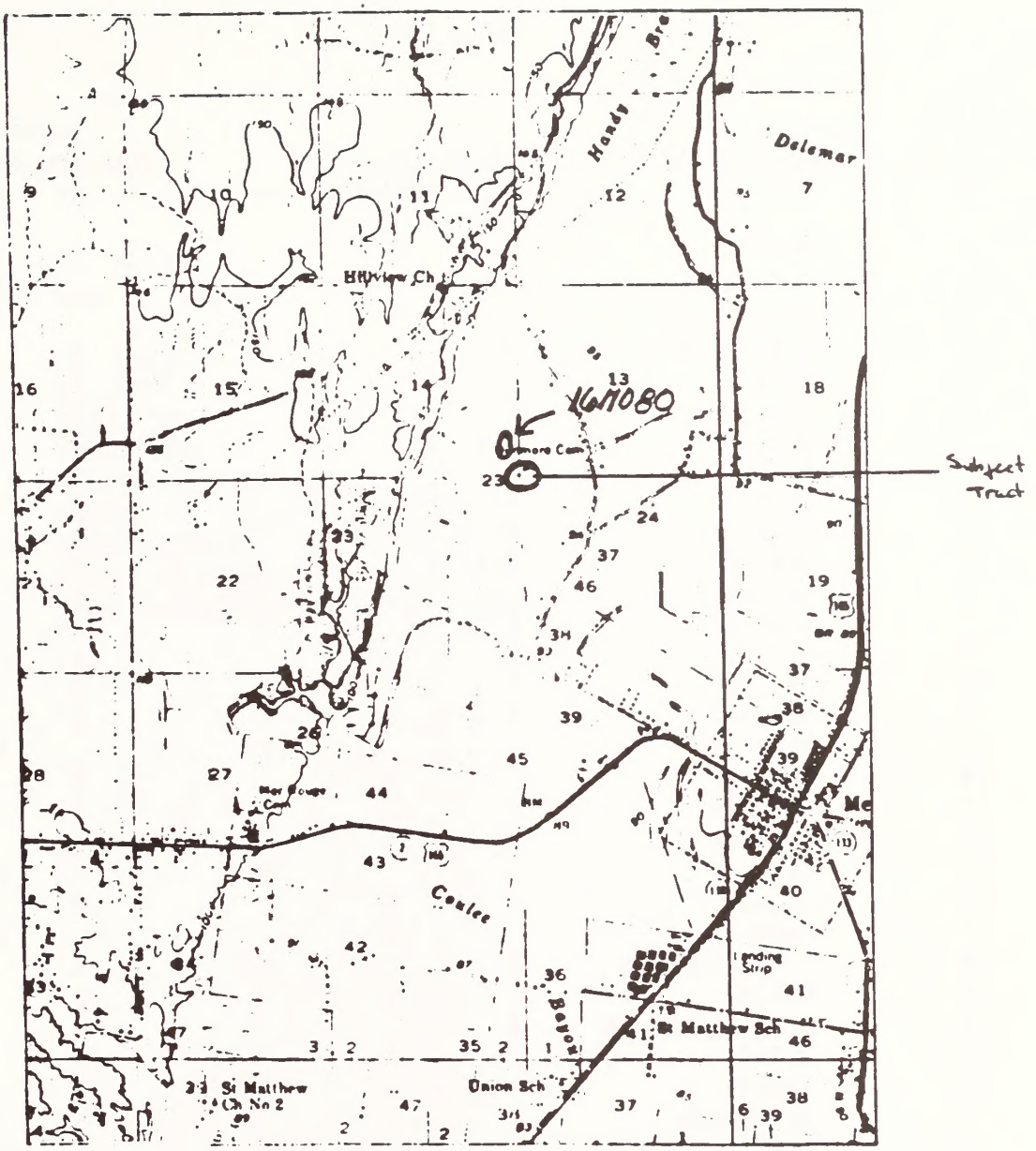
Section: 29 Legal Description: Lot1

Township and Range: T.16N., R.10W. Louisiana Meridian

Acreage: 2.64 County or Parish: Bienville

Quadrangle Name: Bossier Point 7½' State: Louisiana

Case No.: Date: 7-1-85 By: QLB



Field Check revealed trespass.
MVT-96

Scale 1:62,500

Public Lands Louisiana Tract 32

PERTINENT INFORMATION

Section: 23

Legal Description: Lot 1

Township and Range: T. 21N., R. 6E.

Louisiana Meridian

Acreage: .48

County or Parish: Morehouse

Quadrangle Name: Bastrop 15'

State: Louisiana

Case No.:

Date: 7-2-85 By: RB

Enclosure C

Tract No.	Parish	Site Potential			Survey Recommendation	
		High	Medium	Low	Yes	No
1	Acadia		X			X
2	Ascension			X		X
3	Assumption		X			X
4	Bienville	X			X	
5	Bossier	X			X	
6	Bossier	X			X	
7	Bossier	X			X	
8	Bossier	X			X	
9	Bossier	X			X	
10	Bossier	X			X	
11	Bossier	X			X	
12	Bossier	X			X	
13	Bossier	X			X	
14	Bossier	X			X	
15	Bossier	X			X	
16	Bossier	X			X	
17	Bossier			X		X
18	Bossier		X		X	
19	Bossier		X		X	
20	Bossier	X			X	
21	Caddo			X		X
22	Caddo		X		X	
23	Caddo		X			X
24	Calcasieu	X			X	
25	DeSoto		X		X	
26	E. Baton Rouge	X			X	
27	Iberia		X		X	
28	Iberia		X		X	
29	Jefferson		X		X	
30	Same as Tract 42					
31	LaSalle		X		X	
32	Morehouse		X		X	
33	Natchitoches	X			X	
34	Ouachita		X		X	
35	Terrebonne			X		X
36	Terrebonne			X		X
37	Pointe Coupee		X		X	
38	Rapides		X		X	
39	St. John			X		X
40	St. John			X		X
41	St. Charles			X		X
42	St. James			X		X
43	St. Martin		X		X	
44	St. Martin		X		X	X
45	St. Martin		X		X	

Tract No.	Parish	Site Potential			Survey Recommendation	
		High	Medium	Low	Yes	No
46	St. Martin			X		X
47	Same as Tract 3					
48	St. Mary			X		X
49	St. Mary			X		X
50	Vermilion			X		X
51	Vermilion		X		X	
52	Vermilion			X		X
53	Vernon			X		X
54	West Carroll	X			X	
55	West Feliciana		X		X	
56	West Feliciana		X		X	

Appendix 4

PUBLIC LANDS IN LOUISIANA

Appendix 4

Public Lands Louisiana

	Parish	Legal	Acres
1.	Acadia	7S, 2W, Sec. 14, Lot 4	2.36
2.	Ascension	10S, 2E, Sec. 83	.98
3.	Assumption	14S, 12E, Sec. 1	3.59
4.	Bienville	16N, 10W, Sec. 17 Lot 1	1.75
5.	Bienville	16N, 10W, Sec. 29 Lot 1	2.64
6.	Bossier	16N, 10W, Sec. 30 Lot 6	21.45
7.	Bossier	16N, 10W, Sec. 30 Lot 7	28.96
8.	Bossier	16N, 10W, Sec. 30 Lot 8	34.90
9.	Bossier	16N, 10W, Sec. 30 Lot 9	10.64
10.	Bossier	16N, 10W, Sec. 30 Lot 10	39.49
11.	Bossier	16N, 10W, Sec. 30 Lot 11	35.22
12.	Bossier	16N, 10W, Sec. 30 Lot 12	29.28
13.	Bossier	16N, 10W, Sec. 30 Lot 13	25.39
14.	Caddo	17N, 14W, Sec. 8 Lot 1	1.24
15.	Caddo	17N, 13W, Sec. 9 Lot 9	23.12
16.	Caddo	18N, 14W, Sec. 14 Lot 19	.10
17.	Calcasieu	9S, 9W, Sec. 13 E of River	3.00
18.	Concord	4N, 6E, Sec. 2, NENW	40.00
19.	DeSoto	11N, 12W, Sec. 12 Lot 2	21.38
20.	DeSoto	12N, 12W, Sec. 31, SWSE	40.00
21.	E. Baton Rouge (St. Helena)	5S, 2W, Sec. 11	.16
22.	East Baton Rouge (St. Helena)	5S, 2E, Sec. 64, All	636.00
23	Iberia	12S, 6E, Sec. 79	17.50
24.	Iberia	12S, 6E, Sec. 31	19.08
25.	Jefferson	15S, 23E, Sec. 17	25.00
26.	(Same as tract 45)	13S, 17E, Sec. 63	36.82
27.	LaSalle	5N, 3E, Sec. 26	18.14
28.	LaSalle	8N, 4E, Sec. 48, All	641.42
29.	Livingston (St. Helena)	5S, 4E, Sec. 37, All	369.43
30.	Livingston (St. Helena)	5S, 4E, Sec. 39, All	640.00
31.	Livingston (St. Helena)	7S, 6E, Sec. 35, Lot 7 (N & E of river)	7.3
32.	Morehouse	21N, 6E, Sec. 23, Lot 1	.48
33.	Natchitoches	8N, 8W, Sec. 28 SWSW	40.00
34.	Natchitoches	12N, 7W, Sec. 32: Lots 5, 6, 8, 11, & 12	135.00
35.	Ouachita	18N, 4E, Sec. 9	19.00
36.	Plaquemines (St. Helena)	17S, 15E, Sec. 16	52.83
37.	St. Helena	17S, 15E, Sec. 17	9.17
38.	Point Coupee	5S, 9E, Sec. 58	.80
39.	Rapides	5N, 3E, Sec. 26	140.00
40.	Rapides	4N, 1W, Sec. 74, All	132.05
41.	St. John the Baptist (St. Helena)	12S, 8E, Sec. 31	24.88
42.	St. John the Baptist (St. Helena)	12S, 19E, Sec. 1	45.72
43.	St. Charles	14S, 21E, Sec. 11	17.12
44.	St. James (Same as #26)	13S, 17E, Sec. 63	36.82
45.	St. Martin	14S, 11E, Sec. 26 Lot 8	24.27
46.	St. Martin	14S, 11E, Sec. 26 Lot 9	30.37
47.	St. Martin	14S, 11E, Sec. 26 Lot 10	8.95
48.	St. Martin	14S, 11E, Sec. 35 NENW	40.00
49.	(Same as tract 3)	14S, 12E, Sec. 1	3.59
50.	St. Martin	9S, 6E, Sec. 24 SE4	20.00
51.	St. Mary	13S, 18E, Sec. 14 Lot 6	.40
52.	St. Mary	14S, 9E, Sec. 58	360.27
53.	Vermillion	13S, 3E, Sec. 31 Lot 6	30.77
54.	Vermillion	14S, 3E, Sec. 45	6.80
55.	Vermillion	11S, 4E, Sec. 33 Lot 3	.20
56.	Vernon	2N, 10W, Sec. 34 SENE	40.00
57.	W. Carroll	20N, 11E, Sec. 28 Lot 2	5.82
58.	W. Feliciana (St. Helena)	1S, 4W, Sec. 28 Lot 1	1.64
59.	St. Helena	1S, 1W, Sec. 9 NENE	40.00

Consultation With Other Agencies

Ms. Cary Norquist, Botanist — T & E Plants Louisiana
DOI, Fish and Wildlife Service
Endangered Species Office
Jackson Mall Office, Suite 316
Jackson, Mississippi 39213

Mr. Jim Stewart, Wildlife Biologist — T & E Fish and Wildlife Louisiana
DOI, Fish and Wildlife Service
Endangered Species Office
Jackson Mall Office, Suite 316
Jackson, Mississippi 39213

Mr. Gary Lester, Zoologist — Plants and Animals Louisiana
Louisiana Natural Heritage Program
Department of Natural Resources
Coastal Management Division
P. O. Box 44124
Baton Rouge, Louisiana 70804

Mr. John Hefner — Wetlands
U. S. Department of the Inteior
Fish and Wildlife Service
75 Spring Street, SW
Suite 1276
Atlanta, Georgia 30303

Mr. Charles Baxter, Environmentalist — Wildlife
DOI, Fish and Wildlife Service
Ecological Service Field Office
Room 409 Merchants National Bank Building
820 South Street
Vicksburg, Mississippi 39180

Ms. Joyce Allen, Soil Scientist — Soils Prime & Unique Farmlands
Soil Conservation Service
3737 Government Street
Alexandria, Louisiana 71301

Mr. William Huls, Program Manager — Coastal Zone Management Program
Coastal Zone Management
NOAA, Department of Commerce
New Orleans, Louisiana 70160

Mr. Bob Harper, Engineer — Floodplains and Riparian
Corps of Engineers, U. S. Army
P. O. Box 60
Vicksburg, Mississippi 39180

Mr. Remie Kleibert, Engineer — Floodplains and Riparian
Corps of Engineers, U. S. Army
P. O. Box 60267
New Orleans, Louisiana 70160

Mr. Robert C. Joslin, Supervisor
Kisatchie National Forest of Louisiana
2500 Shreveport Highway
Pineville, Louisiana

Mr. Burton Angelle — Wildlife
LA Dept. of Wildlife and Fisheries
P. O. Box 15570
Baton Rouge, Louisiana 70895

Mr. Michael P. Mety, State Forester — Vegetation
Louisiana Department of Natural Resources
Office of Forestry
P. O. Box 1628
Baton Rouge, Louisiana 70895

Mr. Jim Yarbrough (Ms. Karren Young) — Air Quality-Water Quality
Environmental Protection Agency (EPA)
Region VI
First International Building
1201 Elm Street
Dallas, Texas 75270

Mr. William H. Radtkey — Threatened & Endangered Species Coordinator
Bureau of Land Management
1725 I Street
Washington, D.C. 20240

Mr. Bill Johnstone, Environmentalist — Geology
Minerals Management Office (OCS)
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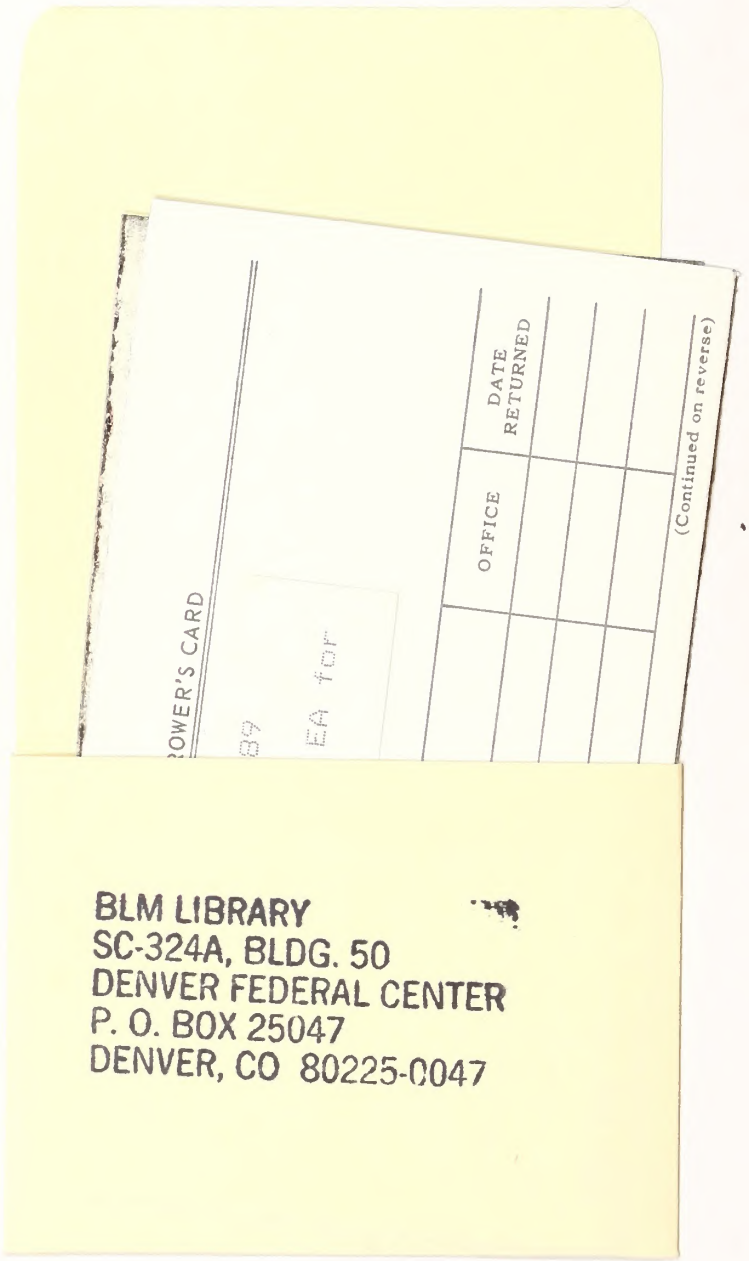

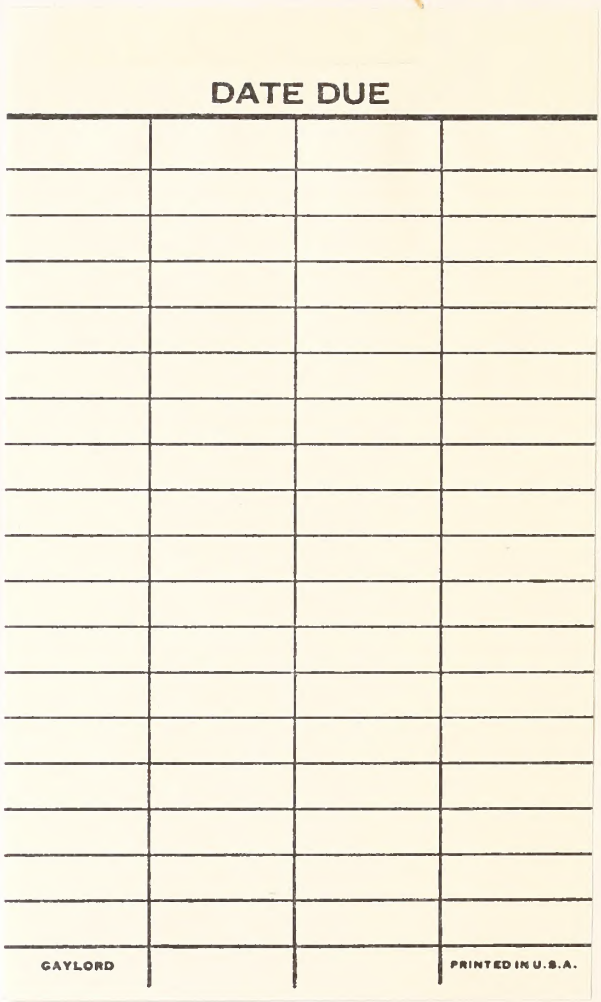

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